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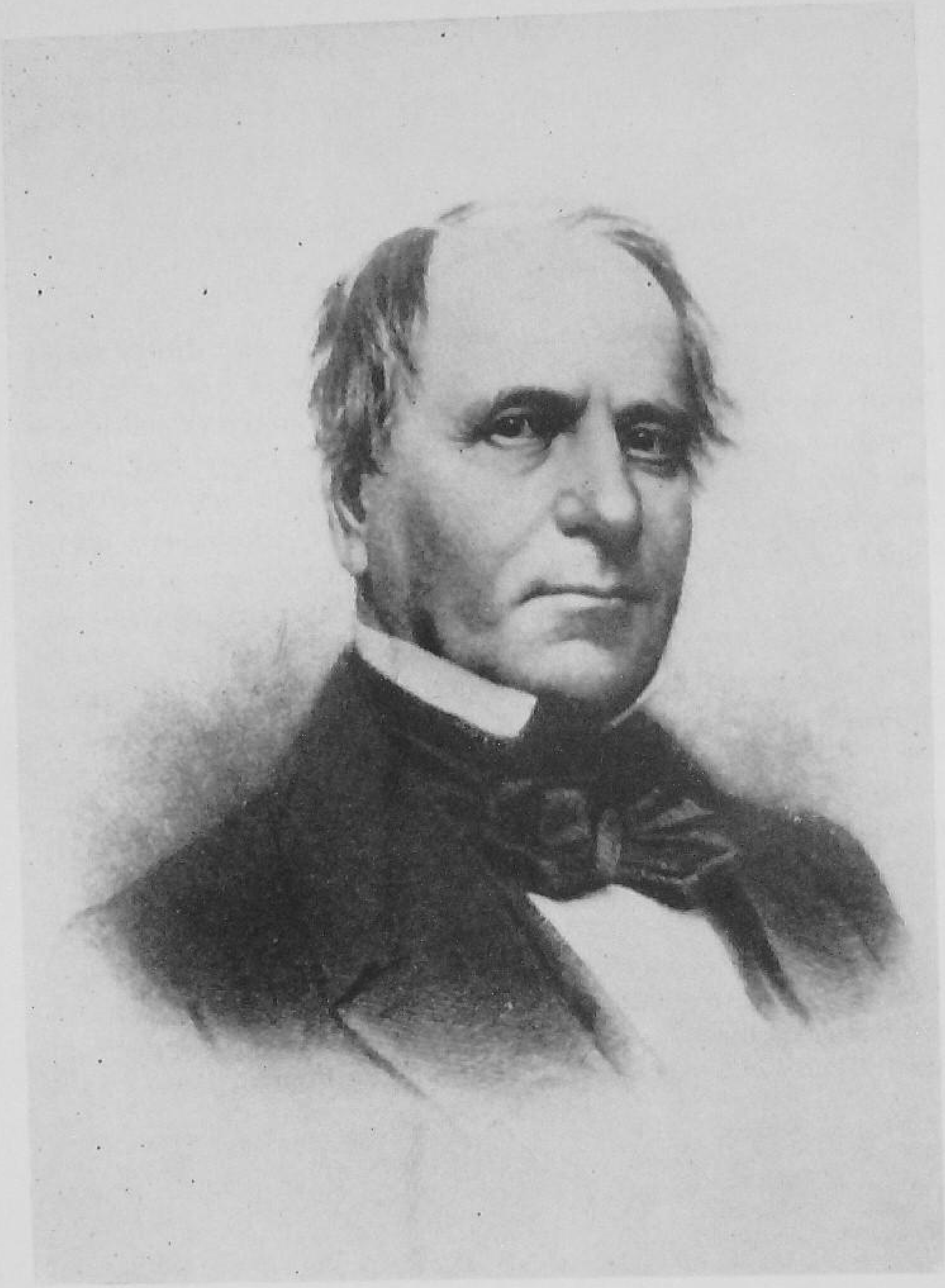
McGRAW-HILL SERIES IN HEALTH EDUCATION, PHYSICAL EDUCATION, AND RECREATION

Clifford Lee Brownell, Consulting Editor

FOUNDATIONS OF COMMUNITY HEALTH EDUCATION



Lemuel Shattuck (1783–1823). *(Courtesy of Dr. Harold W. Stevens, New Bedford, Massachusetts.)*

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A Prophetic Statement

We believe that the conditions of perfect health, either public or personal, are seldom or never attained, though attainable;—that the average length of human life may be very much extended, and its physical power greatly augmented;—that in every year, within this Commonwealth, thousands of lives are lost which might have been saved;—that tens of thousands of cases of sickness occur, which might have been prevented;—that a vast amount of unnecessarily impaired health, and physical disability exists among those not actually confined by sickness;—that these preventable evils require an enormous expenditure and loss of money, and impose upon the people unnumbered and immeasurable calamities, pecuniary, social, physical, mental and moral, which might be avoided; —that means exist, within our reach, for their mitigation or removal;—and that measures for prevention will effect infinitely more, than remedies for the cure of disease.

—Lemuel Shattuck

(In the Report of a General Plan for the Promotion of Public and Personal Health, Devised, Prepared and Recommended by the Commissioners Appointed . . . Relating to a Sanitary Survey of the State, April 25, 1850, Dutton and Wentworth, State Printers, Boston, 1850, p. 10.)

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Clifford Lee Brownell, Consulting Editor

Brownell—Principles of Health Education Applied
Evans and Gans—Supervision of Physical Education
Paterson—Foundations of Community Health Education
Torney—Swimming

Foundations of Community Health Education

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by ROBERT G. PATERSON, Ph.D.

Professor Emeritus, Community Health Organization, School of Social Administration, The Ohio State University; Executive Secretary Emeritus, The Ohio Tuberculosis and Health Association

PRINCIPAL, TRAINING CENTRE FOR VILLAGE GUIDES
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To Ann

who has chosen to carry forward
the torch of health education

EDITOR'S FOREWORD

The early development of American democracy brought with it specialization in community and state governmental functions. Boards of education assumed the responsibility of educating youth in the winnings of the race, boards of health established measures to protect citizens against communicable disease, welfare departments provided various services for indigent families, and many other boards or departments accepted the task of improving the societal living of a democratic people.

During the formative period of these organizations each maintained its autonomy, respecting the principle of law that a power once delegated to one institution of government could not be redelegated to another; nor might one organization usurp the rights legally assigned to a different department or board. Within the strict interpretation of the statutes these functions remain specific, although an increasingly complex civilization demands both an extension of power beyond those incorporated into original legislative enactments and the acceptance of interdependent governmental responsibilities aimed to promote the general welfare.

Examples of extended and coordinated services abound in present-day community affairs. Boards of education now provide kindergartens and classes for adults, in addition to education for youth of compulsory-education age. Boards of health include divisions of child hygiene, prenatal care, and other items, along with communicable-disease control. In problems of community health education the established departments of education and health join forces with other organizations to provide the greatest good for the greatest number of citizens.

With special reference to health, what factors or forces have been responsible for these changes? Perhaps the answer

may be summarized in that familiar term—social progress. Social progress denotes the peculiar blending of economic, political, and social forces at a given time and place. A community decides to establish an adjudged worth-while health activity. So long as the economic, political, and social forces remain in *status quo*, the activity proceeds as initiated. Realignment of these forces leads to change in emphasis or method of attack to find a better way of solving the problem.

Improved standards of living quickened the realization that health problems affect every citizen in the community throughout his life span. Enlightened school authorities finally accepted the doctrine that health, unlike some other educational objectives, has few deferred values and that wisely conceived health programs provide learning situations wherein the child acquires the skill and knowledge to enrich his own life and to protect the welfare of others. At about the same time public health authorities arrived at the decision that a broad system of community health education facilitates the fulfillment of enforcement powers delegated to the board of health by mandatory and permissive legislation.

Throughout the interesting development of community health the private practitioner and numerous unofficial health organizations have kept pace with governmental agencies. Indeed the history of civilization might be written in terms of techniques devised by man to care for his health.

Obviously scientific investigation in recent years has aided in the improvement of these techniques, but who can determine with unrefutable accuracy whether scientific investigation preceded or followed the peculiar alignment of economic, political, and social forces which characterize a given era of history? And who can foretell with confidence what marked improvement in health measures may be achieved within the life span of children already born? The witch doctor gave way to the family physician as knowledge increased, and the highly trained medical specialist of today must devote a large part of his time to the study of methods produced in scientific laboratories. Unofficial health organizations now provide sig-

nificant leadership in helping to stamp out disorders which once threatened the lives of millions of people. The long road of public health from Moses, who established certain hygienic laws governing the children of Israel, to the splendid health departments and hospitals of today presages even greater achievements beyond the horizon of tomorrow.

But wise utilization of these resources depends upon the proper education of the American people. The schools and colleges must assume the major role for this education, supplemented by public health and other departments of government, unofficial organizations, and private practitioners. The coordinated efforts of these groups, based on intelligent understanding, means better community health education.

This book provides basic information for those who are to instruct others—parents, teachers, public health workers, nurses, physicians, dentists, social workers, and persons employed by unofficial organizations. The historic portrayal of health events from primitive times to the present also gives due recognition to the lives of prominent men associated with each era. Perhaps one of the most significant features of the volume is the interpretation of economic, social, and political forces responsible for the initiation and redirection of each event. The author exercises rare and experienced judgment in portraying the previous and current alignment of these forces and events to indicate the future outlook for public health, and the role of the various official and unofficial agencies in building a sound foundation for community health education.

CLIFFORD L. BROWNELL

NEW YORK, N.Y.

PREFACE

"Art, in any but its infant stage, presupposes scientific knowledge; and if every art does not bear the name of science it is only because several sciences are often necessary to form the groundwork of a single art."

—J. S. Mill, "System of Logic," 1843.

Health education is an art. As an art it draws upon scientific knowledge amassed in the pursuit of numerous sciences. These sciences are medicine and its allied sciences—biology, psychology, and the social sciences—and many of the practical arts. The analysis (science) and synthesis (philosophy) of this knowledge constitute the material out of which health education of the individual and the community emerges.

Throughout the entire realm of human activity art is that which enhances an idea. A study of the filiation of ideas in the area of health is the basis for "Foundations of Community Health Education." There is great need for perspective in the art of health education. The facts and principles embodied in health education need to be viewed in the light of historic continuity. Health education in the modern sense evolved slowly in the nineteenth century. During the twentieth century it has progressed at such accelerated pace that its origins are prone to be overlooked or forgotten.

Problems connected with the restoration, conservation, and promotion of health have beset man since his advent on this planet. Ideas, explanations, and attempts to solve these problems have varied with the different states of culture through which society has evolved. It is only within recent years that these problems have received effective study by society. At present, owing to the rapidity of social changes, health prob-

lems have been thrown into bold relief against the background of disorganization in the economic, political, and social arrangements of society.

Throughout the past and present discussions of these problems two distinct ways of looking at them have developed. One view is that the actual survival of an individual is basically, if not entirely, determined by his biological inheritance. This view is labeled the "genetic school." The other is that the efforts put forth by society to prevent premature morbidity and mortality have had a selective effect upon the health of the individual. This view is held by the "environmental school." In essence these opposing views postulate on the one hand that society should permit the law of natural selection to work out its effects without interference with the environment and that a stronger and longer lived race will be developed, or, on the other hand, that society can achieve this end by modification of the environment so as to protect the individual against the premature "accidents of illness or death."

The health problem of today is a community problem. It is no longer possible to separate the health of the individual from that of the community at large. Conditions of work, recreation, education, food supplies, communication, and transportation, which were at one time largely the personal concern of the individual, have become community problems and must be solved as such. The health of the individual influenced largely by the environment presents a similar problem. Like the health of the individual, the health of the community is measured at present by negative results—the minimum of morbidity and mortality.

The extent and manner in which society concerns itself with health problems depends upon the social philosophy that prevails at a given time. Evidence of the growing sense of group solidarity is found in the trend toward the ever larger participation of government in affairs of daily life. Older theories of government have been modified by the newer movement to use governmental machinery for the promotion of the common welfare. In health there is full recognition of the

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principle of group responsibility for the prevention and control of epidemic disease. This is a negative concept. At present the positive concept of the promotion of health, namely, the possibility of improving the health of the individual throughout his life cycle, is struggling for group recognition.

The essential task of community health education is to furnish a working relationship between the so-called *democratic* process and *specialism.* Sixty years ago the individualistic philosophy set forth by writers such as Adam Smith (1723–1790), Scottish political economist; John Stuart Mill (1806–1873), English philosopher and political economist; and Herbert Spencer (1820–1903), English philosopher, had full sway. In America this point of view found a brilliant advocate in William Graham Sumner (1840–1910), political economist of Yale University, in his widely read "What Social Classes Owe to Each Other," published in 1882. The first outstanding writer to combat Sumner's point of view was Lester Frank Ward (1841–1913), American biologist and sociologist, who contended in his "Dynamic Sociology" in 1883 that man can shape his own destiny and that universal education was the way to freedom.

This concept of teleology advanced by Ward became a powerful force in the health field. Dr. Hermann Michael Biggs (1859–1923), American physician and statesman of public health, epitomized it in the aphorism, "Public health is purchasable. Within natural limitations a community can determine its own death rate." Future advances, it is recognized, do not hinge upon cosmic forces beyond man's control.

The main task of health education, then, is to combat constantly false concepts and to replace them with facts and principles based upon current knowledge. Change is the law of all life; nothing in life is fixed. Facts and principles in health education need close scrutiny at all times. Yet in the entire realm of education the constant effort is to oppose the tendency of the individual and the community to regard the *status quo* as immutable.

The plan of this book is to give a broad historical background in Part I and to outline the major developments in the modern public health movement in Part II. References are given for each important phase of the movement as a point of departure. No extended bibliographies are attempted, since these are to be found in numerous works in the special fields of activity, and most of the references given will guide the student to the available material.

As will be evident, the presentation follows historical, chronological, and subject developments of the public health movement. Through this method, it is hoped, the student will secure a better perspective and relationship of the subject.

No claim is made for original contributions to the subject. Most of the material presented will be found in books, pamphlets, journals, and transactions. However, these are sometimes hard to obtain, and the attempt has been made to bring together in one presentation the entire subject drawn from many and diverse sources.

All dates given and spelling of names follow those to be found in Garrison's "History of Medicine." References do not go beyond the year 1948. Acknowledgments to authors and publishers will be found in their appropriate places, and my thanks are due them for their kind cooperation.

The author is indebted to many students and colleagues, both at The Ohio State University and in the field, for suggestions and criticisms. Special acknowledgment is made to Professor John A. Louis, School of Social Administration, The Ohio State University, and to Dr. Ann Paterson, professor of physical education, Women's Division, The Ohio State University, for the practical application of the material in their classroom work over a period of two years. The criticisms and suggestions of Dr. Iago Galdston, executive secretary, Committee on Medical Information, New York Academy of Medicine and Dr. Clifford Lee Brownell, chairman, Department of Health Education and Physical Education, Teachers College, Columbia University, were especially helpful. Appreciation is also expressed to M. Fleeta Thomas, assistant

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ROBERT G. PATERSON

COLUMBUS, OHIO
April, 1950

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PART I

Historical Background

CHAPTER 1

GENERAL OBJECTIVES OF PUBLIC HEALTH

Community health education is a part of the larger subject designated as public health. Public health has been defined by Winslow[1] as "the science and art of preventing disease, prolonging life and promoting physical health and efficiency through organized community effort. . . ." A community is a body politic, such as a village, town, city, county, state, or nation. Health is the quality of life as affected by the condition of the body, the functioning of the various organs, and response of the whole organism to environmental influence.

During the past one hundred years there can be discerned at least five major general objectives toward which the public health movement has aimed. These are broad objectives which have been sought by society in its effort to restore, conserve, and promote the health of individuals and communities.

These major general objectives are:

1. To increase the average length of human life.
2. To decrease the mortality rate from preventable disease.
3. To decrease the morbidity rate from specific diseases.
4. To increase the physical well-being of the individual.
5. To increase the rapidity of adjustment of the individual to his environment.

Increasing the Average Length of Life. From time immemorial society has been interested in what happens to the

[1] C.-E. A. Winslow, "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923, p. 1. By permission.

group. The Psalmist expressed this interest in the longevity of man as "threescore and ten." While some individuals live one hundred or more years, the estimates based upon statistical evidence indicate that the Biblical term of longevity practically corresponds with the present average length of life.[2]

There are three concepts of longevity that must be kept clearly in mind—the life span, the expectation of life, and the average length of life. The *life span* is the extreme limit set to human life by old age. There is no evidence that the life span has changed materially within historical times. The life-span concept can be viewed in the light of natural limits placed by nature on various species of life. A dog is old at fifteen, a cat at twenty-five, an elephant at fifty, a tortoise and a parrot at one hundred, and man at seventy.[3] The *expectation* of life is the average length of time a person of any age may be expected to live. This concept is based upon life tables and is the one used in insurance practice. The *average length of life* is the average number of years lived by all persons born at a given period or by a sufficiently large representative sampling of such persons. An increase in the *average length of life* is entirely compatible with an unchanged *span of life*, and it is in this sense that all figures showing gains in human longevity in past centuries and decades must be understood.

A historical review of longevity in the United States[4] may be summarized as in the table on the opposite page.

The average length of life in the United States, it will be seen, has increased by almost one-third since the beginning of the century. In 1900–1902 the average length of life at birth for white males was 48.23 years and for white females 51.08. In 1944 the corresponding estimated figures were

[2] Louis I. Dublin and Alfred J. Lotka, "Length of Life—A Study of the Life Table," The Ronald Press Company, New York, 1936; "The Money Value of Man," The Ronald Press Company, New York, rev. ed., 1946.

[3] Raymond L. Ditmars, "Thrills of a Naturalist's Quest," The Macmillan Company, New York, 1932, Chap. 14.

[4] Dublin and Lotka, "Length of Life," pp. 53–56.

63.55 and 68.95—a gain of 15 and 18 years respectively. These gains have been concentrated largely in childhood, adolescence, and early adult life. Mortality in 1900–1902 was such that one-quarter of the babies would have died before attaining age twenty-five, whereas in 1945 age fifty-seven would be reached before that proportion died. Therefore

Year	Expectancy of life at birth, years	Based upon life tables
1789	35.5	Wigglesworth
1850	38.30 males 40.50 females	Kennedy
1878–1882	41.74 males 43.50 females	Billings
1890	42.50 males 44.46 females	Glover
1901	46.07 males 49.42 females	Glover
1929–1931	60.86 males, white 62.83 females, white	Dublin
1939–1941	62.81 males, white 67.29 females, white	U.S. Census Bureau*

* Thomas N. E. Greville, "United States Life Tables and Actuarial Tables, 1939–1941," Government Printing Office, Washington, D.C., 1946, pp. 34, 36.

these gains can be traced to reduced mortality of infants and to reduced mortality of young people from preventable diseases.

The change in the relative impact of disease as measured by the mortality rate is shown in Table 1 (page 6).

Decreasing the Mortality Rate from Preventable Diseases. The term "preventable" as applied to diseases has a changing connotation with varying conditions and increasing knowledge. Prevention is based upon knowledge of causation.[5] As

[5] Edward J. Stieglitz, "A Future for Preventive Medicine," Commonwealth Fund, Division of Publication, New York, 1945, p. 1.

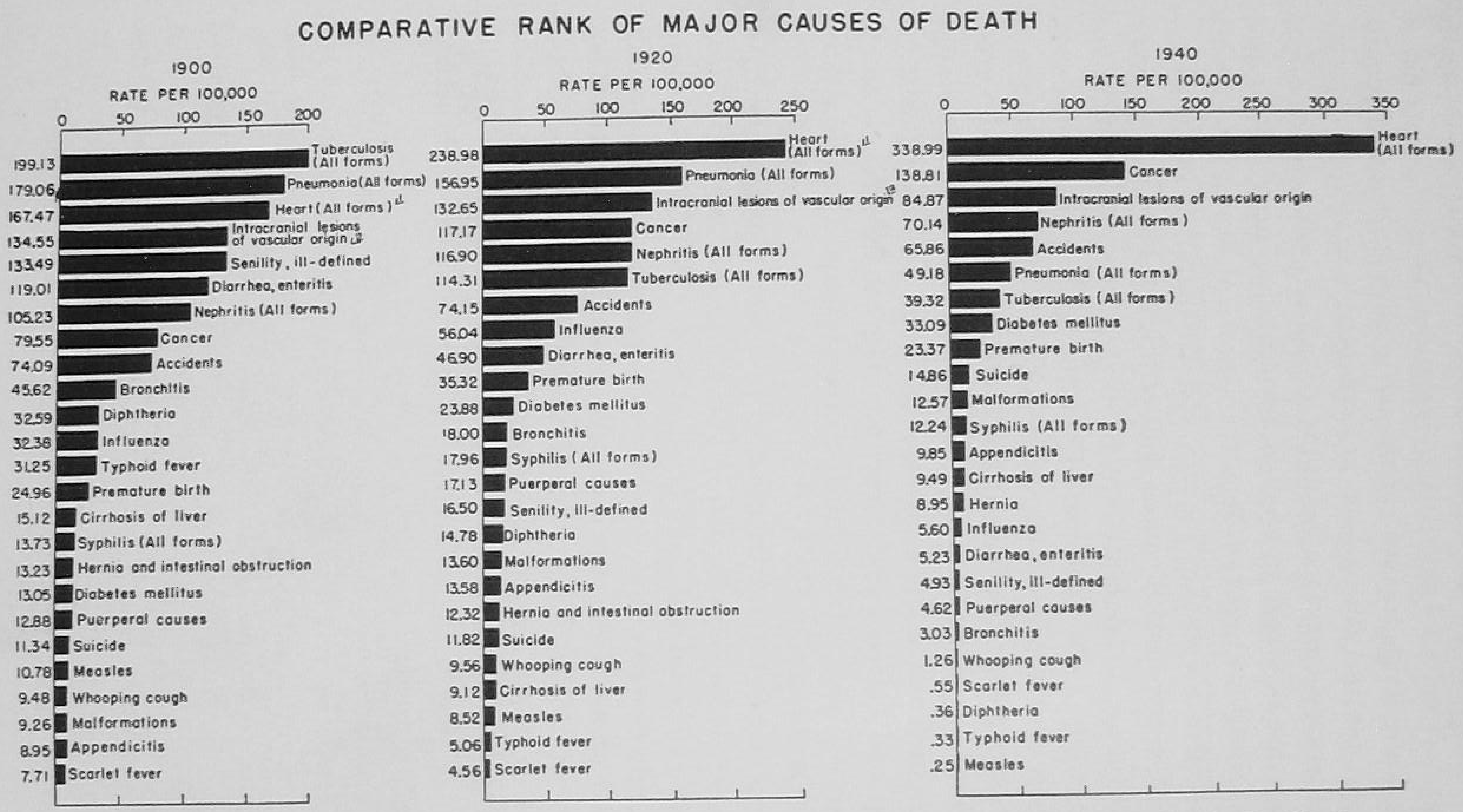

TABLE 1. From I. M. Moriyama and Mary Gover, "Statistical Studies of Heart Diseases," *U.S. Public Health Reports*, Vol. 63, No. 17, April 23, 1948, p. 542.

scientific knowledge of the causation of diseases has expanded there has resulted a growing technique in the application of that knowledge. This technique is directed toward the environment and toward the individual.

Mortality rates are methods of community measurement. They do not show an increase of individual health, but represent group averages of negative aspects of health. Mortality rates afford valuable indexes for comparative purposes between communities, states, and nations. They are measures of variation in individual and community circumstances and conditions. An examination of the general mortality rates reveals that from the beginning of the twentieth century to 1945 more than one-half of the decrease in the general mortality rate has come as a result in the reduction of deaths from four preventable diseases—typhoid fever, diphtheria, tuberculosis, and diarrhea and enteritis. The tabular review on the following page brings out the dramatic aspect of the control of these diseases.

Diphtheria represents a disease in which the scientific cycle of knowledge is complete. We know the cause, the mode of growth, and the manner of spread. We have the means to induce active and passive immunization or specific individual protection. Theoretically, there should never be any cases or deaths from diphtheria in any community. Such cases or deaths as do occur are due to accident, ignorance, neglect, or blind refusal to accept the procedures that have been shown to be effective. The control of diphtheria is wholly a medical problem.

Typhoid fever, on the other hand, presents a different problem. Its remarkable reduction is due principally to the application of sanitary engineering to water, milk, and food and the technique of socially applying such knowledge. It is true that immunization by vaccination has contributed to the end results, but the control of typhoid fever is attributed by most public health authorities to the control of the human environment. Between 1900 and 1915 the typhoid fever mortality rates were held to be an index to a community's

TABLE 2. CRUDE MORTALITY FROM FOUR SELECTED PREVENTABLE DISEASES, 1900–1945*

Diphtheria

Year	Number	Rate per 100,000 population (both sexes)
1900	8,056	40.3
1910	10,023	21.1
1920	13,211	15.3
1930	5,741	4.9
1940	1,457	1.1
1945	1,598	0.9

Typhoid and Paratyphoid Fever

Year	Number	Rate per 100,000 population (both sexes)
1900	6,244	31.3
1910	10,695	22.5
1920	6,582	7.6
1930	5,616	4.8
1940	1,443	1.1
1945	534	0.4

Tuberculosis (all forms)

Year	Number	Rate per 100,000 population (both sexes)
1900	38,820	194.4
1910	73,028	153.8
1920	97,366	113.1
1930	83,352	71.1
1940	60,428	45.8
1945	52,916	40.1

Diarrhea, Enteritis, and Ulceration of the Intestines

Year	Number	Rate per 100,000 population (both sexes)
1900	28,491	142.7
1910	54,795	115.4
1920	46,266	53.7
1930	30,502	26.0
1940	13,573	10.3
1945	11,465	8.7

* Federal Security Agency, U.S. Public Health Service, National Office of Vital Statistics, Washington, D.C., communication, Dec. 31, 1947.

health consciousness. The control of typhoid fever is mainly in the realm of sanitary science.

Tuberculosis control is due to the application of partial scientific knowledge through the technique of social and economic machinery. We know the cause, the mode of growth, and the manner of spread. We lack, thus far, the means to induce active or passive immunity or any means of specific individual protection. Failing these, the control of tuberculosis has been brought about by individual and community health education. Society has been encouraged to provide the agencies that have operated as a substitute for the lack of scientific means of specific individual protection. The control of tuberculosis is, at present, in the realm of the social use of education.

Diarrhea and enteritis, the so-called summer complaint of infants, has been reduced in cases and deaths by the application of sanitary measures. Clean water, milk, and food have led to social methods of prevention. The scientific knowledge is not definite.

These four diseases illustrate the varied status of scientific knowledge and the techniques that have been developed to increase control. The same presentation can be applied to many other preventable diseases, but careful analysis of the existing scientific knowledge and the techniques is required for each disease. No generalization can safely explain the decline in the death rates from preventable diseases.

A further caution in the use of statistical methods needs to be kept in mind by the community health educator. Just as there are wide variations among individuals in disease and health, so there are wide variations within communities and nations. Repeated studies have shown the variation in disease incidence and mortality within sections of a community. The same facts have been found to exist in various sections of the nation. One illustration will suffice. The infant mortality rate for the nation as a whole in 1940 was 47.0 per 1,000 live births. In New Mexico it was 99.6. In Connecticut the rate was only 34.1. Had the Connecticut rate prevailed

throughout the nation thousands of infants would have been saved in that year alone.[6]

TABLE 3. INFANT MORTALITY (UNDER ONE YEAR OF AGE)*
Birth Registration States, 1915–1945

Year	Number	Rate per 1,000 live births
1915	77,572	99.9
1920	129,531	85.8
1930	142,413	64.6
1940	110,984	47.0
1945	104,684	38.3

* Federal Security Agency, U.S. Public Health Service, National Office of Vital Statistics, Washington, D.C., communication, Dec. 31, 1947.

Decreasing the Morbidity from Specific Diseases. Morbidity rates are the statistics of sickness and disease. These rates show the occurrence of diseases and their relative prevalence in different localities, at different times, and with respect to such factors as sex, age, and racial groupings. Mortality statistics record the cases of death, while morbidity statistics include all known cases of illness. Morbidity statistics are much less reliable as an index of physical well-being than mortality statistics.

A moment's reflection will furnish the reason. Many cases of reportable illness are never brought to the attention of the physician and the public health authorities. Even when cases are brought to his attention, the physician may neglect or refuse to report such diseases to the public health authorities. Again, the element of error in mistaken diagnosis tends to vitiate such statistics. Finally, morbidity statistics are subject to incompleteness in the records filed with the public health authorities.

For many years communities and states have required the reporting of certain communicable diseases as a means of pro-

[6] "Medicine in the Changing Order," Report of the Committee on Medicine and the Changing Order, New York Academy of Medicine, Commonwealth Fund, Division of Publication, New York, 1947, p. 38.

tection of the community. While most reportable disease lists contain the diseases that have caused large numbers of deaths, there are variations between communities in their legal requirements. Therefore, the utmost care must be exercised in the use of morbidity statistics and especially so on a comparative basis. The best that can be said of the value of morbidity rates is that they give an indication of the general state of health of a community at a given period of time. This is especially marked in times of widespread epidemics of specific diseases.

Increasing the Physical Well-being of the Individual. Objective measurement of the physical well-being of the individual is difficult. Physical well-being of an individual has external and internal aspects. The external evidences of health are those that convey to the observer signs of health or illness. These physical signs are found usually in the eye, the skin, the hair, the muscular system, the posture, and movement of an individual. The height-weight relationship with reference to age, sex, and physical type is another external evidence of physical well-being. The internal evidences are those felt by the individual from day to day and are not always apparent to the observer.

Individual differences in physical well-being can be discerned in any close analysis of groups. These differences are shown in the aging process between individuals on an age, sex, and racial scale. Additional evidence has accumulated as a result of the mass physical examinations for military service. Further facts have been gathered in this area by surveys that have been conducted from time to time and from place to place. These surveys are of two kinds—*prevalence* studies to discover the existence at a given time and place of the prevalence of a given disease in a given population group and *incidence* studies to reveal the amount of illness present in a given population group in a specific time interval.

All these indexes are used to measure the presence or absence of physical well-being in groups. The broad assump-

tion is that with a decrease in mortality rate there is a corresponding decrease in the morbidity rate and that this leads to an increase in the physical well-being of the individual.

Another term for describing the physical well-being of the individual is *vitality*. Here we have concepts associated with the environmental factors affecting the individual. "Evidence at present points to the conclusion that environmental factors have had a far greater influence than *genetic factors* in determining the rate at which the American people survive. The decline in the mortality rate may be properly interpreted to mean that conservation of vitality has been highly effective."[7]

Increasing the Rapidity of Adjustment of Man to His Environment. The quality of life we call "adaptability" is of the greatest concern to the community health educator. At present there are three distinct forces at work to establish a theoretically complete adaptability of the individual to his environment. These forces stem from medicine, the biological sciences, and the social sciences. It is generally well-known that in a large number of diseases the reactions of different individuals to one and the same disease-provoking factor are diverse in kind or in degree and that these variations are referable to differences in the characteristics of individuals.

The cause of the disease in such cases is manifestly twofold. There is an environmental factor provoking the reaction and an individual factor determining the kind and the nature of the reaction of the individual to this environmental factor. There is an innate or acquired susceptibility in the individual to react to a particular environmental stimulus in a certain way. Any number of specific examples of this fact can be cited. For example, what is it that causes an anaphylactic

[7] "Recent Social Trends in the United States," Report of the President's Research Committee on Social Trends, McGraw-Hill Book Company, Inc., New York, 1933, Vol. 1, Chap. XVI, "The Vitality of the American People," by Edgar Sydenstricker, pp. 602–660, quote from p. 659. By permission.

reaction of one individual to certain immunization procedures and not of another? Why does one individual die from a given disease and another recover? Or, to view the question on another plane, what makes a Babe Ruth, a Joe Louis, a Bobby Jones, or any other champion performer in the whole realm of athletic competition? It may be summed up in the high degree of adaptability of the particular individual to the demands of the environment in which he operates.

The quality of adaptability is exhibited in the growing rates of mortality and disability due to accidents. Individuals are killed or injured in larger and larger numbers as the number of risks are multiplied and individual adaptability fails to keep pace with such increased risks. Adaptability is also concerned with the ability of the body defenses to ward off disease. The entire area of immunization is one in which the attempt is made to increase the ability of the body to combat pathogenic microorganisms. A part of the field of knowledge embraced in nutrition is also of this character.

At present our knowledge of what constitutes an optimum environment in the family, the school, and the community far surpasses our knowledge, imperfect as it is, of what are to be the standards of, or the tests for, positive health or optimal efficiency.

Examination of these five general objectives of public health reveals that *intensive* and *extensive* study has been devoted to *disease* and relatively little research has been directed to *health*. If health is thought of as a positive concept, then it follows that mere negative attempts to palliate or even to cure specific diseases cannot be considered as solutions to an understanding of health. Much of our confusion arises from the use of the term "health services" when we really mean "sickness services." It will be seen that the scope of activities embraced in public health has expanded at first slowly and now rapidly from "sickness services" to embrace "health-creating services," such as more and better food, improved housing, recreation, and *economic* and *social* security. While

our knowledge of these services is limited, more and more attention is being given to these areas in the effort to establish standards or tests for positive health.

Public health objectives are analogous to those of agricultural objectives and can be viewed in terms of basic questions: What is needed in agriculture to raise a good crop? What is needed in society to raise a healthy generation of people? It is to the further understanding and elaboration of the meaning of this question that public health addresses itself today.

The task of community health education is to keep abreast of this growing understanding and to interpret the facts as they relate to the family, school, and community. These facts lie in the area of medicine, biological science, and social science. In the realm of medicine the facts are concerned with the study of the form and the degree of correlation between variations in health and efficiency. In the area of the biological sciences the facts have to do with variations in characterization, genetic or acquired. In the sphere of the social sciences the facts relate to variations in social circumstances. A new term to describe these facts of variation has crept gradually into the literature concerning health—*social medicine.*[8]

The general objectives of public health are intimately involved in the term *community health education.* In the next chapter we shall see how the term has evolved through the study of different concepts about the three words composing the term, individually and collectively.

Suggested Reading

Winslow, C.-E. A., "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923.

[8] For an interesting and instructive discussion of this term see George Rosen, "Approaches to a Concept of Social Medicine, A Historical Survey," *The Milbank Memorial Fund Quarterly*, Vol. 26, No. 1, January, 1948, pp. 7–21; and, by the same author, "What Is Social Medicine? A Genetic Analysis of the Concept," *Bulletin of the History of Medicine*, Vol. 21, No. 5, 1947, pp. 674–733.

Hall, Marguerite F., "Public Health Statistics," Paul B. Hoeber, Inc., New York, 1942.

Stieglitz, Edward J., "A Future for Preventive Medicine," Commonwealth Fund, Division of Publication, New York, 1945.

"Medicine in the Changing Order," Report of the Committee on Medicine and the Changing Order, New York Academy of Medicine, Commonwealth Fund, Division of Publication, New York, 1947.

Rosen, George, "Approaches to a Concept of Social Medicine," *The Milbank Memorial Fund Quarterly*, New York, January, 1948.

CHAPTER 2

THE MEANING OF COMMUNITY HEALTH EDUCATION

One of the greatest difficulties confronting the teacher or student of public health is the lack of precise definition of words and terms used to convey the ideas of disease and health. These difficulties seem to multiply with the increase in the literature dealing with preventive medicine, public health, and health education.

Because the phrase *community health education* contains words which are relative in character, it behooves the health educator to be definite in the way the words are used in day-to-day discussion. Each one of these words can be used in at least three connotations. One is the general or popular meaning, another is the administrative sense, and another is the technical use. Much of the confusion in exposition of health stems from the inconsistent uses of the words and the context in which they are placed. A number of attempts[1] to

[1] C.-E. A. Winslow, "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923, p. 1.

"Public Health Nomenclature," Report of the Committee, American Public Health Association, *American Journal of Public Health*, Vol. 15, No. 4, April, 1925, pp. 335–336.

"What Is Public Health?" Symposium, *American Journal of Public Health*, Vol. 18, No. 8, August, 1928, pp. 1018–1021.

"Definition of Terms in Health Education," Report of the Committee, Health Education Section, American Physical Education Association, *Journal of Health and Physical Education*, Vol. 5, No. 10, December, 1934, pp. 16–17, 50–51.

"Health Education," Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, with the cooperation of advisory com-

reach agreement in these fields have been made over the years, but thus far no authoritative single source of definition has been established.

The most recent definition suggested has been by the Committee on Hygiene and Public Health of the American Medical Association[2] and is

"Public Health" is the art and science of maintaining, protecting and improving the health of the people through organized community effort. It includes the arrangements whereby the community provides medical services for special groups of persons and is concerned with prevention or control of disease, with persons requiring hospitalization to protect the community and with the medically indigent.

An example of the difficulty in precise definition is the word "community." A community may be defined as a form of social organization which meets certain human needs. Upon examination of this definition it is revealed immediately that "human needs" may be *geographic* in terms of land area, *political* in the system of laws governing the group, *social* in the opportunities afforded for social intercourse, *economic* in the dominant processes for earning a livelihood, and *psychological* in the degree to which a group may be like-minded. Thus the word may have at least five basic connotations as

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mittees, National Education Association, Washington, D.C., 2d rev. ed., 1941, p. 16.

Edward J. Stieglitz, "A Future for Preventive Medicine," Commonwealth Fund, Division of Publication, New York, 1945, pp. 1–5.

Wilson G. Smillie, "Preventive Medicine and Public Health," The Macmillan Company, New York, 1946, Chap. 1, pp. 3–6.

Proceedings of the Conference on Preventive Medicine and Health Economics, September 30–October 4, 1946, University of Michigan, Ann Arbor, 1947.

"What Is Health Education?" Symposium, *American Journal of Public Health*, Vol. 37, No. 6, June, 1947, pp. 641–652.

"Constitution," World Health Organization, adopted July 22, 1946, in Oliver E. Byrd, "Health Instruction Year Book," Stanford University Press, Stanford University, Calif., 1947, pp. 267–270.

[2] *Journal of the American Medical Association*, Vol. 138, No. 17, Dec. 25, 1948, p. 1235. By permission.

commonly used. These basic connotations are complicated further when we add the adjectives urban, suburban, rural, agricultural, industrial, and educational.

The problem becomes even more intricate when we use the phrase "community health education." It becomes necessary to agree upon a definition of each of the component words—community, health, and education. When we examine the word "health" we find ourselves in the same situation we met in using the word "community." Health comes from the Anglo-Saxon word "haelth," meaning whole. Wholeness is that quality of life in which the body is sound, the various organs function naturally, and the whole organism responds adequately to its environment. It is not only the absence of disease, freedom from defect, or postponement of death. It is a positive accomplishment in which we enjoy and use to the full, in happiness and strength, the well-controlled powers passed on to us with the gift of life.

Education has many meanings. Analysis of the word reveals a number of definitive names commonly employed There are those who would confine education to the teaching and learning process. Some would define it as the process of helping the maturing individual to make the transition smoothly into the life and culture of the group. Others would restrict the concept still further to the conscious and purposeful control of learning by the more experienced members of society. Still others would limit education to the work of certain special agencies, such as the tutor and the school, which presumably are devoted exclusively to the two-fold task of teaching and learning.

If education is regarded primarily as the gradual, smooth induction of the maturing individual into the life and culture of the group, and if the group is broadly conceived to include the dead as well as the living, then this process is clearly essential to both the renewal and the growth of human society. In its absence, the achievement of society would be limited by the powers and to the experiences of the individual, and what is known as culture could not develop.

The question as to whether the family, the church, or the state shall have control of the education of the child is no nearer settlement today than when it was first discussed by Plato and Aristotle, who already had before them the laissez-faire practice of the Athenians and the state-controlled system of the Spartans. The universal tendency today is toward the provision of education by the public as represented by the community.

Education is recognized as a continuous learning process which begins with the birth of the child and persists throughout life. Accordingly, a system of public education is no longer limited to the provision of elementary and secondary education, but consists of *schools* and *institutions* as varied as the needs of the individuals that make up a community.

The meaning, then, of the phrase "community health education" is a process employed in meeting the physical and mental needs of the social organization as expressed in health.

A further difficulty arises when we enter the realm of medicine. Increased knowledge leads to changing concepts. The past one hundred years has witnessed rapid changes in the entire field of medicine.

Today medicine has come to be divided into three main activities—curative medicine, preventive medicine, and public health. In general, *curative medicine* embraces all those activities that are employed to restore the individual to normal participation in daily life. *Preventive medicine* embraces all those activities that are the direct responsibility of the individual in the prevention of disease and the promotion of the health of himself and his family. *Public health* embraces all those activities that are undertaken for the prevention of disease and the promotion of health, which are, primarily, a community responsibility.

A further difficulty confronts the teacher or student when the attempt is made to relate the concept of "community health education" to the broader disciplines embraced under the headings public education, public health, and public welfare. One aid to the resolution of this problem lies in a thorough grasp of

the historical evolution (especially in the nineteenth century) of these three broad activities employed by society to meet the needs of the individual.[3]

The social needs of the individual are embraced in the broad, inclusive term "social security." Public education, public health, and public welfare are parts of the concept of social security. Community health education is a part of public health just as social work is a part of public welfare. Underlying all of these separate approaches to social security is the continuous process of education.

Historically each of these avenues of approach developed its own ideas, techniques, and philosophy with little reference to the others. This led to the gradual organization and administration of each discipline within its own chosen area. Public education was originally concerned with the teaching process involved in reading, writing, and arithmetic. There was almost no realization that poverty or health were related to its discipline. With the passage of time, accumulated experience, and increased knowledge, it gradually was seen that the learning process was affected by the physical and mental condition of the individual, and inquiry began to be made into questions of the health of the school child. This inquiry led to medical inspection of school children and to the provision of school feeding.

The same broadening of viewpoint may be traced in the efforts of society to deal with the problems of disease and poverty. As more and more facts were elicited in both of these areas there was found to be a close correlation between the conditions that produced disease and poverty. Each of these disciplines began widening its horizons to include additional measures and techniques to solve its problems. It was not long before the close relationship between education, health,

[3] See "Encyclopedia of the Social Sciences," Index to Public Education, Health and Welfare, The Macmillan Company, New York, 1937, Vol. VIII.

"Social Work Year Books," Russell Sage Foundation, New York, Vols. 1–9, 1929–1947.

and welfare became apparent. Today the fundamental processes in each of these areas are recognized as common to all of them. Solution of the problems of ignorance, disease, and poverty is a joint responsibility of education, health, and welfare with the common objective of social security for the individual.

One result of this historical development in these three areas was that there arose duplication and overlapping of effort in their application to the individual. There is emerging today a recognition of the need for unity in these three disciplines. This recognition is typified in the establishment of the Federal Security Agency,[4] which embraces public education, public health, and public welfare. Gradually it is believed this trend toward unity will extend to state and local spheres of action.

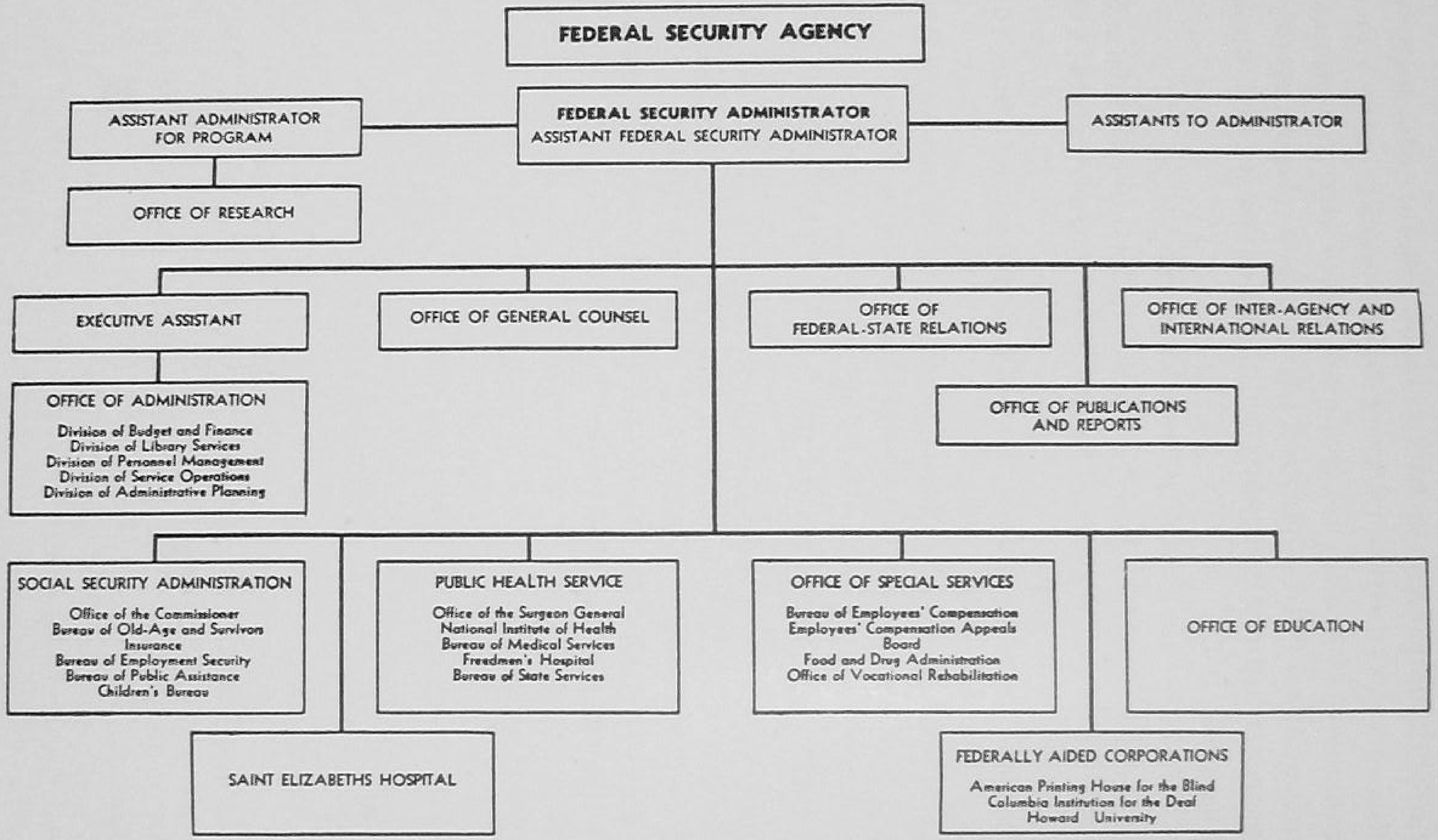
Basically the struggle for social security, which until about a hundred years ago was an individual responsibility, is one directed by the community against the destructive powers of ignorance, disease, and poverty. Other names for these destructive forces are illiteracy, pestilence, and famine. The control of these destructive forces, which are age-old in their pressures upon man, have yielded under the impact of individual and community education. And community health education, it is seen, has its part to play in the diminution of the effects and ultimately the conquest of these destructive forces in present-day society.

With a clear view of the several objectives of public health

[4] Federal Security Agency, Washington, D.C., *Social Security Bulletin* (monthly), "Social Security Year Book" (annually).

A report of a joint committee of the American Council on Education and National Social Welfare Assembly would substitute "security" for "welfare." Yet it seems clear that the social security of the individual embraces education, health, and welfare. (Report of the Committee on a Federal Department of Health, Education and Security, American Council on Education, Washington, D.C., 1947.) A further title change suggested the next year was "Department of Human Resources" rather than the "Department of Health, Education and Security" proposed in 1947.

CHART I. ORGANIZATION OF THE FEDERAL SECURITY AGENCY, 1948*



* The National Archives, "U.S. Government Manual," Washington, D.C., 1948, p. 597.

and a definite concept of community health education, we come now to their application to the population of a given community. In the next chapter it will be seen that the quantity and quality of population has a marked relationship to the destructive forces of health and the effort of society to mitigate them.

Suggested Reading

"Encyclopedia of the Social Sciences," Index to Public Education, Health and Welfare, The Macmillan Company, New York, 1937, Vol. VIII.

"Social Work Year Books," Russell Sage Foundation, New York, Vols. 1–9, 1929–1947.

McMillen, Wayne, "Community Organization for Social Welfare," University of Chicago Press, Chicago, 1945.

Williams, Jesse Feiring, and Fannie B. Shaw, "Methods and Materials of Health Education," The Ronald Press Company, New York, 1946.

Otto, Margaret, "Community Organization for Health and Welfare Services," A Selected Bibliography of Publications in 1947, Russell Sage Foundation, New York, 1948.

King, Clarence, "Organizing for Community Action," Harper & Brothers, New York, 1948.

CHAPTER 3

THE QUANTITY AND QUALITY OF POPULATION

The art of health education in the control of the destructive forces of ignorance, disease, and poverty has a basic relationship to the population problem confronting any nation. The interest is in both the quantity and the quality of the population. The relationship of the art of health education to the population problem has to do with the increase or decrease of a total population. In either case there is concern about the composition of the population. The composition of the population influences the marriage, divorce, birth, and death rates. As a further concern health education has a direct interest in disease rates as a factor in the vitality of the population and in the ability of a nation to survive.

Health is a matter of utmost importance to the individual, the community, the nation, and the world. This importance relates to both the quantity and the quality of health possessed by individuals at any given time. The quantity and quality of health varies with individuals, communities, and nations. This variation becomes evident where the entire population of the world is brought into review.

Traditionally, the world population is presented on the basis of one nation or territorial group against another. Population problems confront a nation in war and in peace. In war, they are related to man power for military purposes and for productive power. In peace, they are related directly to the standards of living, vitality, or human welfare.

Vitality of populations, in turn, is related to fertility and fecundity rates found to prevail at any given time. *Fertility*

is the actual rate of the production of offspring in any given population. *Fecundity* is the potential power to produce offspring. While fertility may be on the decline in a given population, there may be no evidence that the fecundity or physiological power to reproduce has changed either for better or for worse. These two concepts need to be kept constantly in mind by all health educators.[1]

The objective of population theory is an understanding of the effects of increase or decrease of population on human welfare. There are three important aspects of population theory: (1) the demographic phase, which deals statistically with population composition and movement per se, (2) the biosocial phase, which is concerned with differential rates of movement—especially human fertility—as correlated with social and economic status and with organic inheritance in reference to the bearing of these differentials on the quality of the populations; and (3) the socioeconomic phase, which considers the interrelations between population and social and economic institutions with primary reference to the standard of living. The world as a whole has increased in population since the middle of the eighteenth century. This tremendous growth in world population is revealed in Chart II.

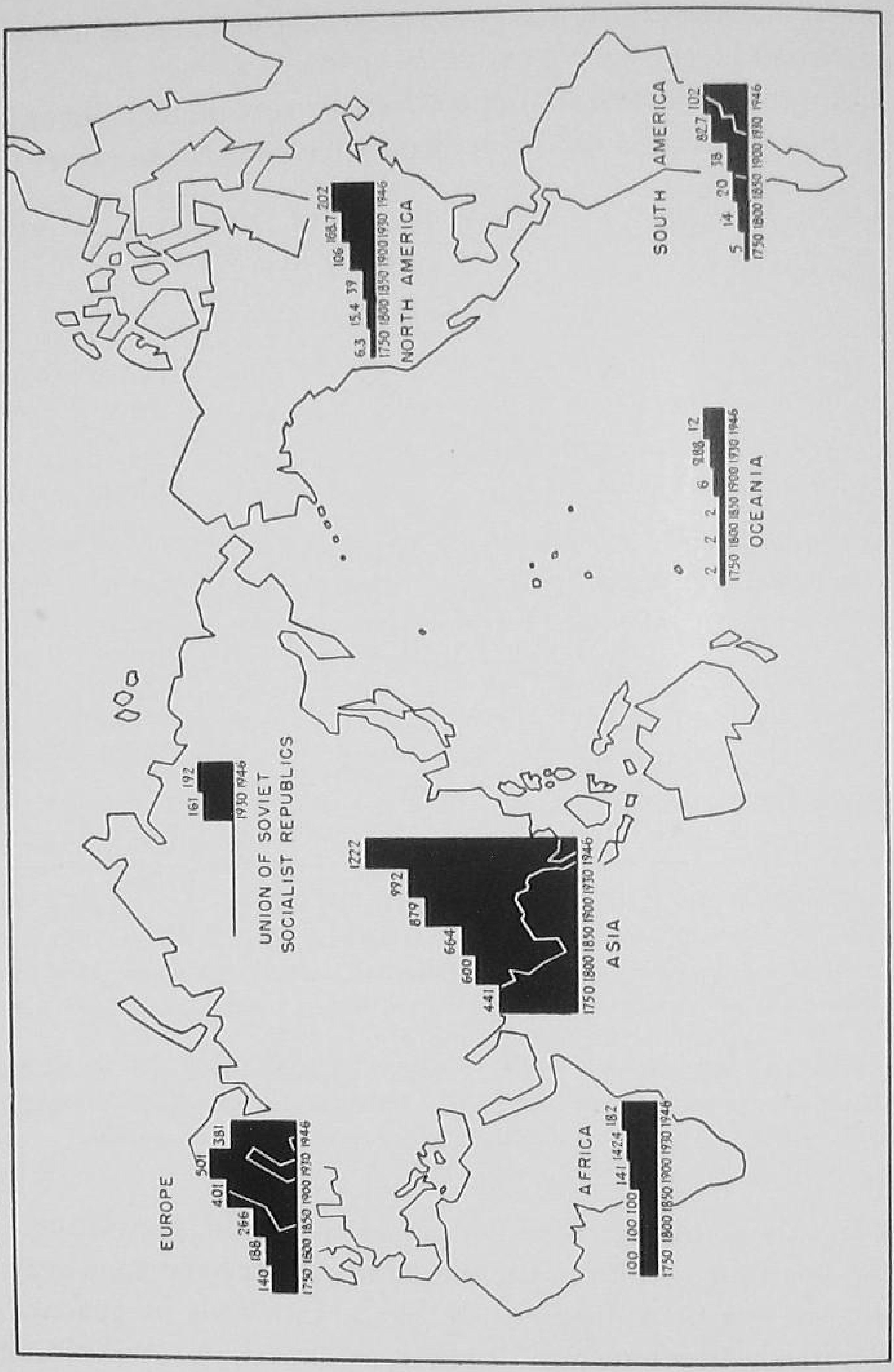
A tabular view of the estimates of world population is given in Table 4. These figures are at best approximations and are given to indicate the tremendous growth of population over the entire world[2] within the past two hundred years. In spite of the advances in invention, agriculture, medicine, public health, transportation, and communication, it may well be that this mere increase in the number of people throughout the world may be one of the basic explanatory facts for the

[1] Harry Elmer Barnes, "Society in Transition—Problems of a Changing Age," Prentice-Hall, Inc., New York, 1940, p. 204.

[2] Walter F. Willcox, "Population of the World and Its Modern Increase in Studies in American Demography," Cornell University Press, Ithaca, N.Y., 1940.

J. Frederick Dewhurst, "America's Needs and Resources," The Twentieth Century Fund, Inc., New York, 1947, pp. 30–51.

CHART II. ESTIMATES OF WORLD POPULATION BY CONTINENTS (IN MILLIONS)



extreme social disorganization to which we have been witness since 1913.

A careful review of human history reveals that the law of normal nature is a relatively stationary population rather than

TABLE 4. ESTIMATES OF WORLD POPULATION BY CONTINENTS, 1750–1946*

(In millions)

Continent	1750	1800	1850	1900	Dec. 31, 1930	Midyear, 1946
Europe (except USSR)......	140.0	187.0	266	401	501.00	381†
Asia (except USSR, including Turkey..	406.0	522.0	671	859	992.50	1,222
Africa.........	100.0	100.0	100	141	142.40	182
North America.	6.3	15.4	39	106	168.75	202
South America.	6.1	9.2	20	38	82.75	102
Oceania.......	2.0	2.0	2	6	9.88	12
USSR.........	....	....	....	....	161.00	192‡
Total world population	66.4	835.6	1,098	1,551	1,901.38	2,293

* The figures for 1750 to 1900 are from Harry Elmer Barnes, "Society in Transition—Problems of a Changing Age," Prentice-Hall, Inc., New York, 1940, p. 203.

The figures for 1930 and 1946 were furnished by Forrest E. Linder, chief, Population and Vital Statistics Section, Statistical Office, United Nations, Lake Success, N.Y., in a personal communication dated Jan. 27, 1948.

† Excludes estimates for Estonia, Latvia, Lithuania, Bessarabia, North Bukovina, Ruthenia, and parts of Finland, East Prussia, and Poland, incorporated into USSR in 1940. These territories had a population of about 22,200,000.

‡ Includes those territories incorporated in 1940 as shown in preceding note.

a rapidly growing population. The world population, as viewed from continent to continent, exhibits enormous variations in health and efficiency, wide variations in genetic or acquired characters, and dramatic variations in social circumstances from famine to plenty. This is the problem with which the World Health Organization of the United Nations is confronted. The solution of the problem may well take a century or more to achieve.

Conservation of our *natural* resources has been a subject of

concern in the United States since the middle of the nineteenth century.[3] It is only since the turn of the century that the equally important task of *human* conservation has gained national attention.

Human conservation differs from the conservation of our natural resources, not only because people are our most valuable resource, but more importantly because our people are free citizens who must determine for themselves how they should use or abuse their lives, their health and their own personal welfare.[4]

Next to China (457,835,475), India (388,997,955), and Russia (192,000,000), the United States (139,621,431) has the largest population of any nation, having approximately 7 per cent of the estimated 2 billion world population.

The human resources of the United States are the people —the men, women, and children—who make up the approximately 140 millions of our total population.[5] An examination of the population figures of the nation reveals that in forty years, from 1790 to 1830, the growth in numbers was slow. By 1830 there were almost 13 million people in the United States. These people were living, for the most part, under a rural economy. There was a high birth rate and a correspondingly high death rate. There was little immigration. No effective public health work had been instituted.

In the next sixty years, from 1830 to 1890, the population increased from 13 millions to 63 millions. These people were beginning to congregate in cities, and immigration was slowly adding to the population. The death rate was high, as was

[3] Report of the National Conservation Commission, 60th Cong., 2d Sess., Sen. Doc. No. 676, 1909.

National Resources Committee, "The Problem of a Changing Population," Washington, D.C., May, 1943.

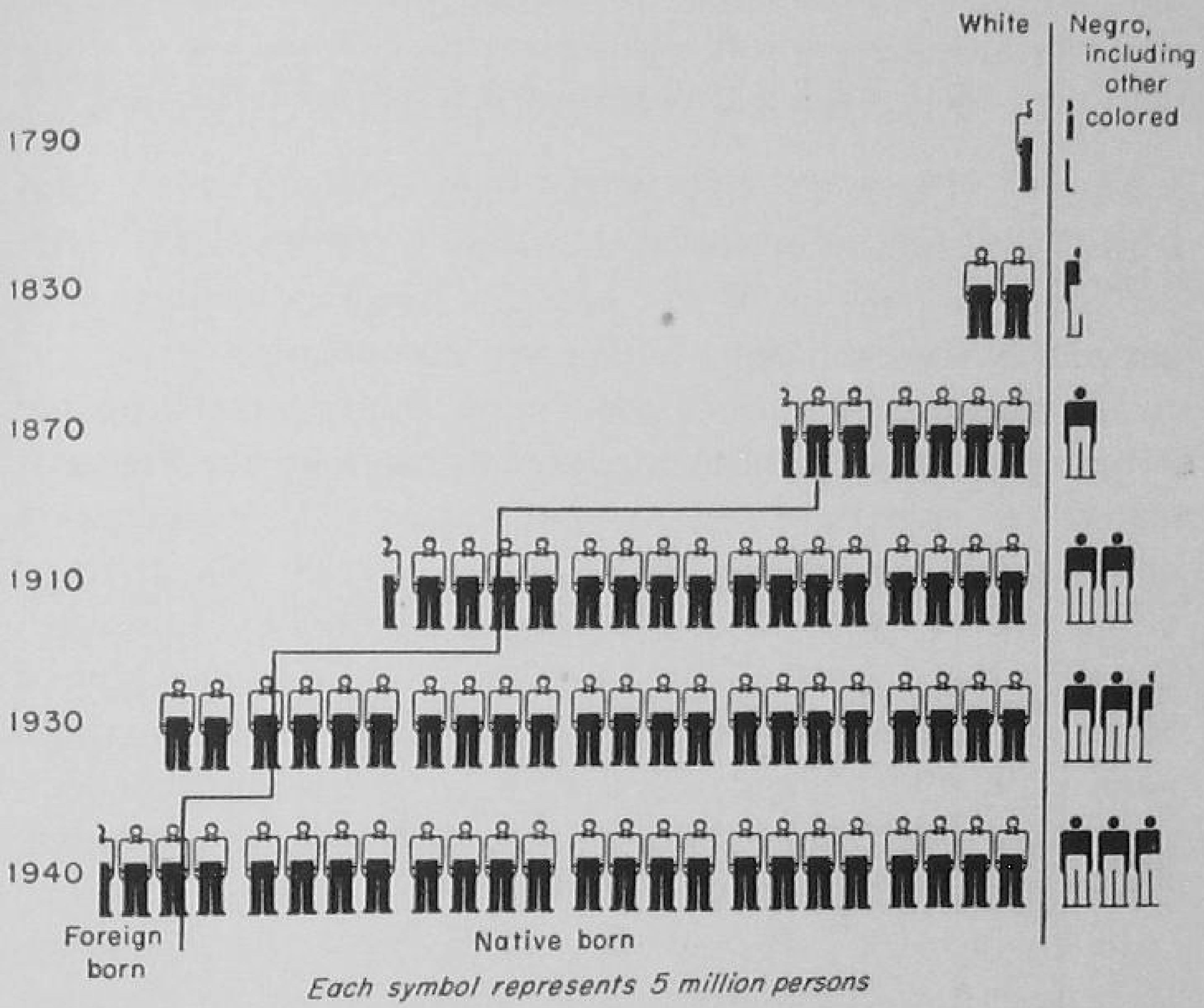
[4] National Resources Planning Board, "Human Conservation—The Story of Our Wasted Resources," Washington, D.C., March, 1943, p. 1.

[5] The U.S. Bureau of the Census estimated that the population of the United States on Dec. 31, 1948, was 147,946,000, compared with 131,668,275 in 1940 (1950 census figures not available before publication of this book).

the birth rate. Public health work on an environmental basis was just beginning to be established.

From 1890 to 1945, a period of fifty-five years, the population increased from 63 millions to an estimated 140 millions.

CHART III. THE GROWTH OF POPULATION IN THE UNITED STATES (1790–1940)*

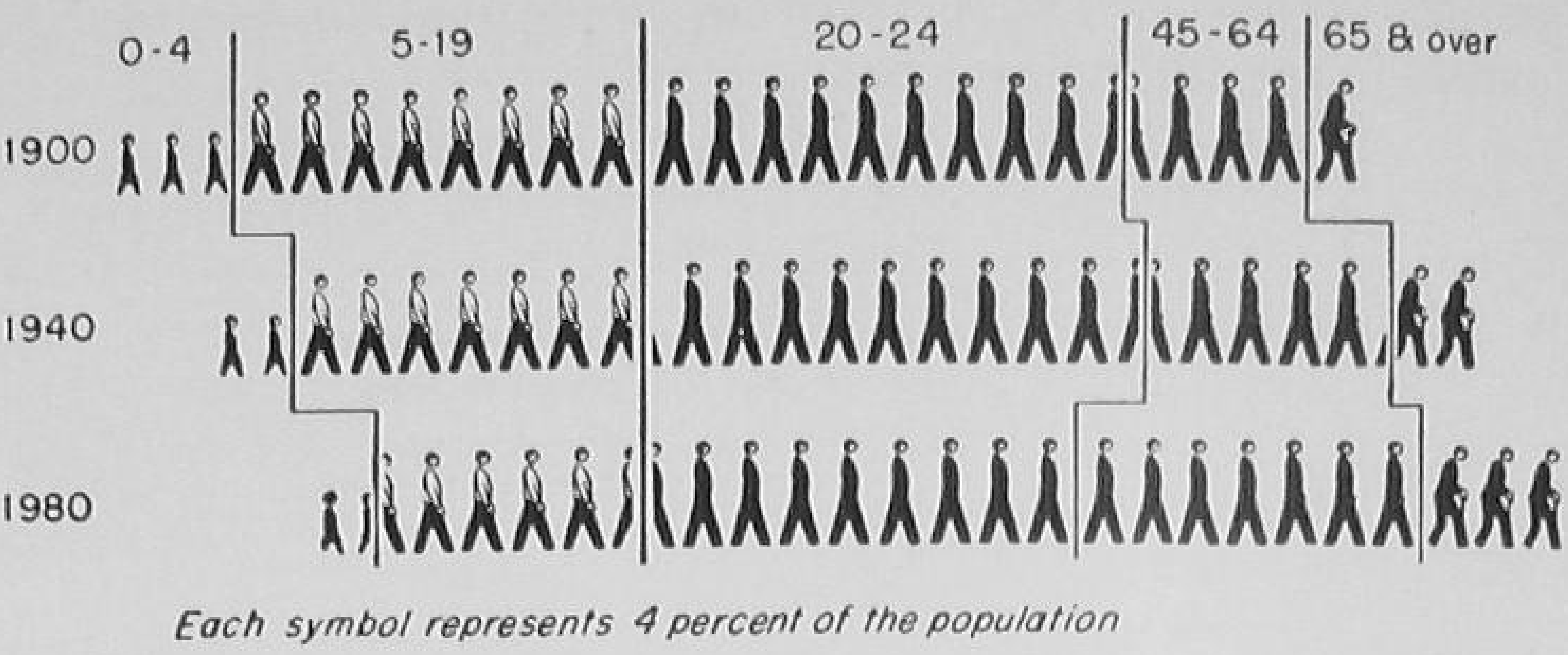


* National Resources Planning Board, "Human Conservation: The Story of Our Wasted Resources," March, 1943, p. 4.

In this period the growth in numbers was rapid. Immigration reached its peak in 1910–1914. The death rate declined, as did the birth rate. The shift of population from rural to urban areas was accelerated. In 1940 the urban population was 56.5 per cent of the total in the United States. The public health program enjoyed an amazing development during this period.

The 1940 census showed an increase of 8,894,229 over the population of 1930. This was an annual increase of 7.6 per cent per 1,000. The annual increase per 1,000 population had

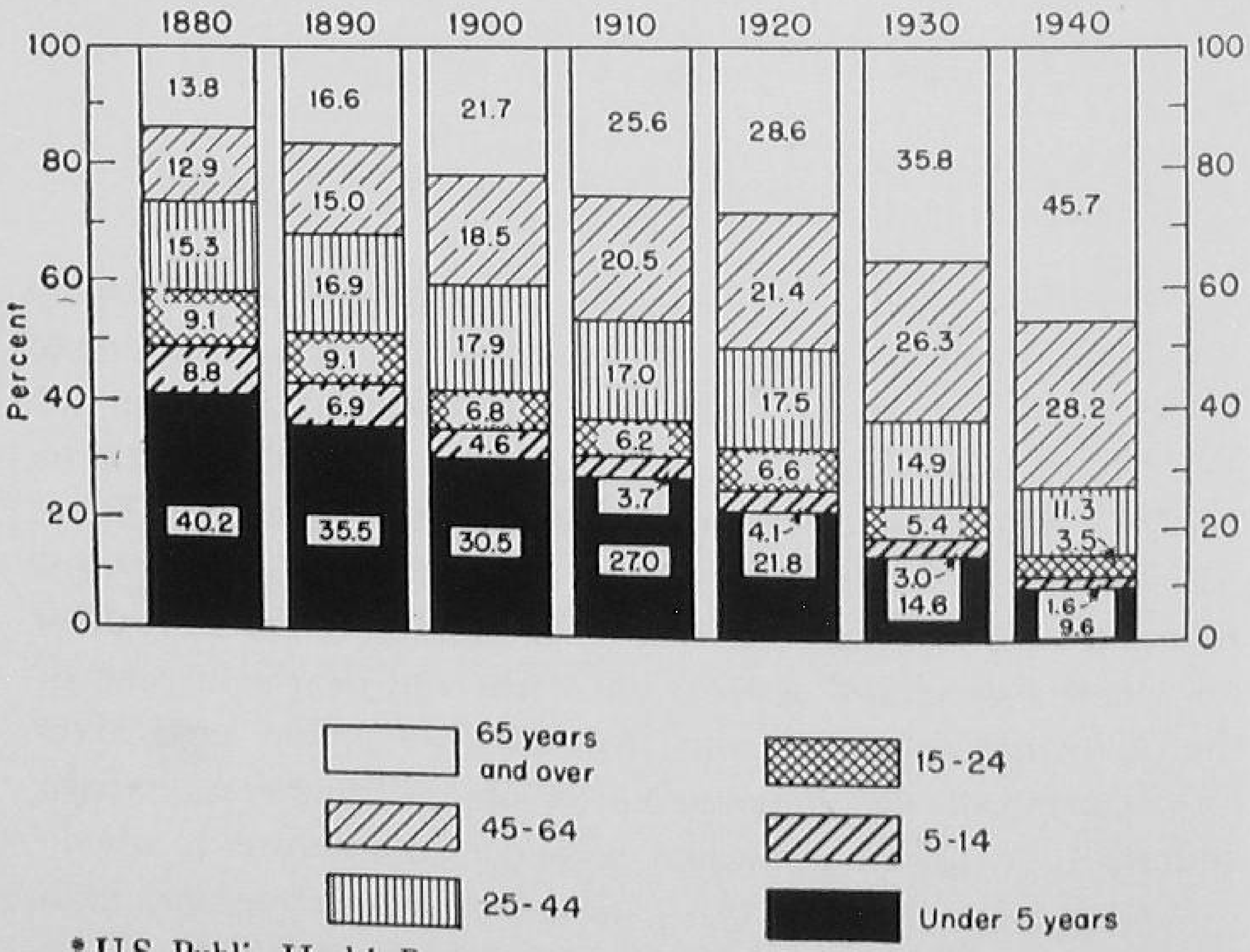
CHART IV. OUR POPULATION IS GETTING OLDER*



* National Resources Planning Board, "Human Conservation: The Story of Our Wasted Resources," March, 1943, p. 5.

been declining since 1890. However, the real significance of the health problem in relation to population was the decrease in the number of children under five and between five and nine years of age.

CHART V. PERCENTAGE OF DEATHS IN SPECIFIED AGE GROUPS (1880–1940)*



* U.S. Public Health Reports, Vol. 63, No. 17, April 23, 1948, p. 538.

Both these groups have shown decreases in the 1930 and 1940 census periods. The growth in population since 1790 is shown in the following table.

TABLE 5. GROWTH IN POPULATION OF THE UNITED STATES* SINCE 1790

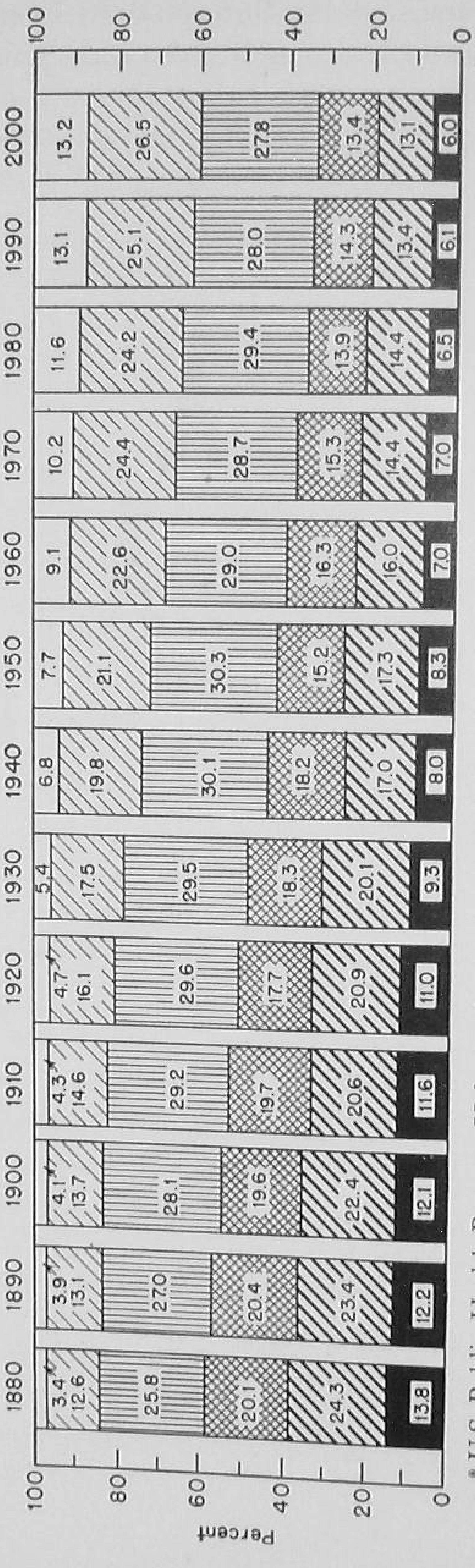
Year	Population in thousands	Annual increase per thousand
1790	3,929	
1800	5,308	35.1
1810	7,239	36.4
1820	9,638	33.1
1830	12,866	33.5
1840	17,069	32.7
1850	23,191	35.9
1860	31,443	35.6
1870	39,818	22.6
1880	50,155	30.1
1890	62,947	25.5
1900	75,994	20.7
1910	91,972	21.1
1920	105,710	14.9
1930	122,775	16.1
1940	131,669	7.2
1945†	139,621	3.6

* Bureau of the Census, U.S. Department of Commerce, 1946, pp. 6–7.
† Estimated by the Bureau of the Census.

Notwithstanding the fact that considerable improvement was made in the various state registration systems the United States remained, up to 1900, the only civilized nation of the Western world which did not possess a national registration system. The first census of population in the United States was taken in 1790 and has since continued every ten years. In a series of attempts to supply national data the Bureau of the Census collected reports on births and deaths in each of the decennial censuses from 1850 to 1900.[6] The unsatisfactory nature of the data collected on an enumeration basis limited the value of published reports. In an effort to obtain

[6] It is interesting to note that Lemuel Shattuck drew up the census blanks for the first collection of births and deaths in 1850.

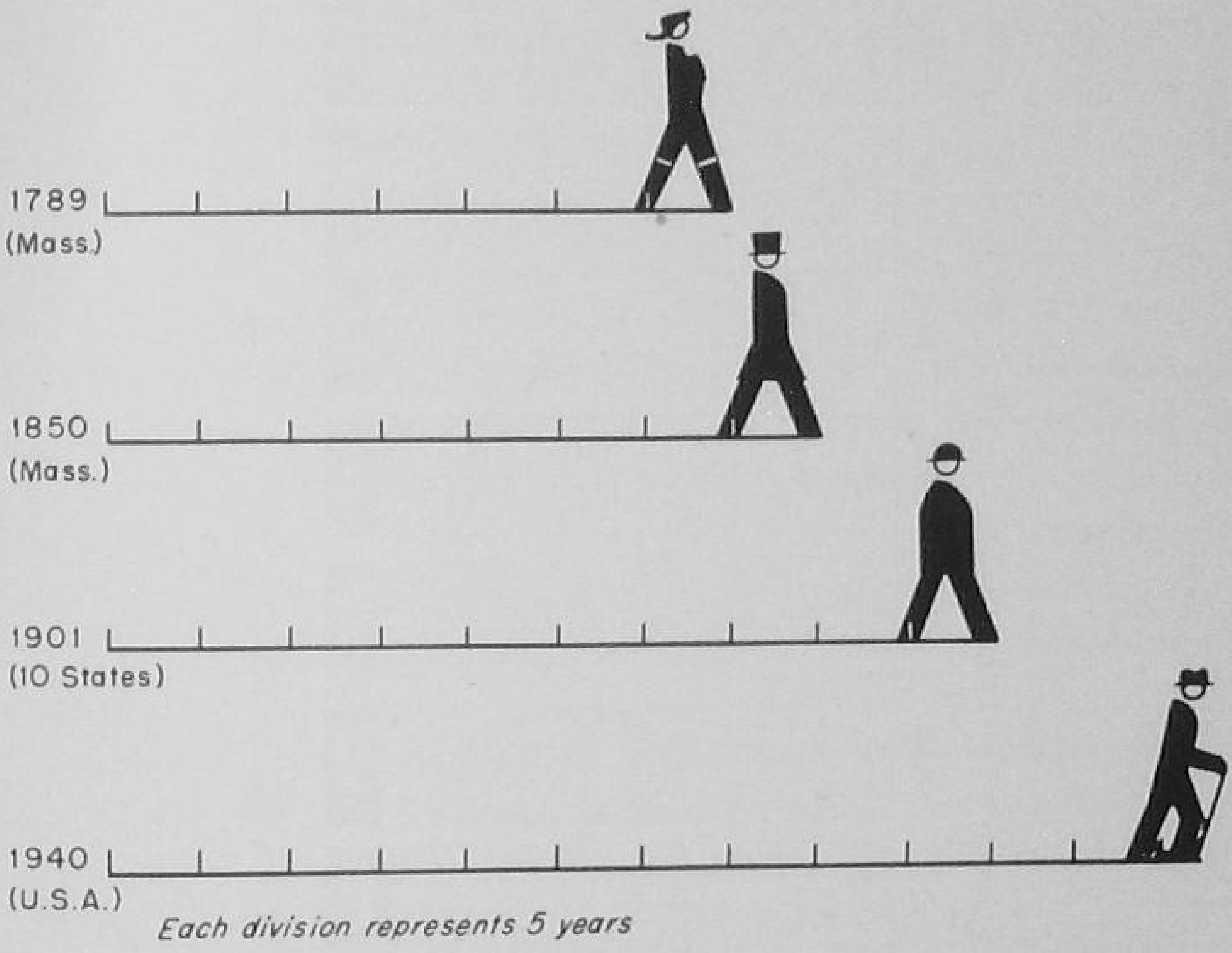
Chart VI. Percentage of Population in Specified Age Groups (1880–2000)*



* U.S. Public Health Reports, Vol. 63, No. 17, April 23, 1948, p. 540.

more accurate statistics the Bureau of the Census in 1880 established a registration area for deaths. This original area consisted of only two states—Massachusetts and New Jersey—whose registration was complete enough to justify publication of data by the Federal government.[7]

CHART VII. PROGRESS IN FIGHT AGAINST DEATH AND ILLNESS: LIFE EXPECTATION (1889–1940)*



* National Resources Planning Board, "Human Conservation: The Story of Our Wasted Resources," March, 1943, p. 13.

In 1902 the Census Bureau, which had heretofore functioned only in census years, was made a permanent agency by Act of Congress. This act authorized the Director of the Census to determine which states and cities had satisfactory registration systems and to obtain annually from these places copies of records filed in the vital statistics offices. The death

[7] Haven Emerson, "Administrative Medicine," Thomas Nelson & Sons, New York, 1941, Chap. V, pp. 325–353.

J. W. Trask, "Vital Statistics," *Public Health Reports*, Supp. 12, 3d ed., 1915.

registration area established in this manner consisted of ten states, the District of Columbia, and a number of large cities in registration states. There was no increase in the area until 1915, when five states were added, and the subsequent growth was slow until 1933, when all of the states were included. A similar area for birth registration was first established in 1915, when the area began with ten states and the District of Columbia. Again growth was slow. But by 1933 all forty-eight states were included in the birth and death registration areas, and since then the annual official vital statistics publications have referred to the entire United States.

The explanation for the long and slow process lies in our form of government. There was no express constitutional power for the Federal government to enact vital statistics legislation of national scope. The Bureau of the Census sought to increase the number of states in the registration area by encouraging and assisting them in perfecting their registration organizations.

Students of population appear to agree that there are four basic trends present in the population of the United States.

TABLE 6. POPULATION, NUMBER OF BIRTHS, BIRTH RATES, AND PER CENT OF TOTAL AREA FOR CERTAIN PERIODS, BIRTH REGISTRATION STATES, 1900–1945*

Year	Estimated mid-year population of the birth registration area	Per cent of total United States population	Per cent of total United States land area	Total number of births	Rate per 1,000 population
1900	†				
1910	†				
1915	31,096,697	30.9	9.9	766,304	25.0
1920	63,597,307	59.7	38.8	1,508,874	23.7
1930	116,544,946	94.7	88.6	2,203,958	18.9
1940	131,970,224	100.0	100.0	2,360,399	17.9
1944	138,083,449	100.0	100.0	2,794,800	20.2
1945	139,621,431	100.0	100.0	2,735,456	19.6

* Federal Security Agency, U.S. Public Health Service, National Office of Vital Statistics, Washington, D.C., communication of Dec. 31, 1947.

† Figures not available for these years.

First, the trend in actual population is upward and is likely to continue for the next twenty years. Second, the trend in the birth rate is downward and is likely to continue so for the next twenty years.

Third, the trend in the death rate has been downward and is probably as low as it will ever reach.

TABLE 7. GENERAL DEATH RATE IN THE UNITED STATES FOR THE GIVEN REGISTRATION AREA*

Year	Number of deaths	Death rate (crude) per 1,000 population
1900	343,217	17.2
1910	696,856	14.7
1920	1,118,070	13.0
1930	1,327,240	11.3
1940	1,417,269	10.7
1944	1,411,338	10.6
1946	1,395,617	10.0

* "Vital Statistics of the United States," U.S. Department of Commerce, Bureau of the Census, 1940, Part 1, p. 20.

Fourth, the trend in the causes of deaths from the communicable diseases to chronic diseases is likely to continue.

The nineteenth century was a wholly unusual episode in the biological history of man. The discovery of new land and the industrial revolution, together with the rise of medical science, made possible an unprecedented population growth. New land has been relatively exhausted, the industrial revolution has passed through its main stages, and medical science has done its major work (for the time being) in reducing the death rate. A decline of population growth today would make it possible to raise the standard of living and to make daily existence really worth while for more of the population. It would enable us to give more attention to the quality rather than the mere quantity of the population.

As we view the general objectives of public health and the application of community health education techniques to any population group it becomes evident that economic, political, and social factors must be taken into account. These factors

TABLE 8. MORTALITY FROM SELECTED CAUSES OF DEATH IN SUCCESSIVE DECADES, DEATH REGISTRATION STATES, 1900–1945*

Cause of death	Death rates (per 100,000 population)						Proportionate mortality (percentage of deaths, all causes)					
	1900	1910	1920	1930	1940	1945	1900	1910	1920	1930	1940	1945
All causes	1,719.1	1,468.0	1,298.9	1,132.1	1,074.1	1,062.1	100.0	100.0	100.0	100.0	100.0	100.0
Communicable diseases:												
Tuberculosis (all forms)	194.4	153.8	113.1	71.1	45.8	40.1	11.3	10.5	8.7	6.3	4.3	3.8
Pneumonia (all forms) and influenza	202.2	155.9	207.3	102.5	70.1	51.8	11.8	10.6	16.0	9.1	6.5	4.9
Diarrhea and enteritis	142.7	115.4	53.7	26.0	10.3	8.7	8.3	7.9	4.1	2.3	1.0	0.8
Diphtheria	40.3	21.1	15.3	4.9	1.1	1.2	2.3	1.4	1.2	0.4	0.1	0.1
Typhoid fever	31.3	22.5	7.6	4.8	1.1	0.4	1.8	1.5	0.6	0.4	0.1	0.04
Chronic diseases of older ages:												
Diseases of the heart (all forms)	137.4	158.9	159.6	214.2	291.9	321.5	8.0	10.8	12.3	18.9	27.2	30.3
Intracranial lesions of vascular origin	106.9	95.8	93.0	89.0	90.8	97.9	6.2	6.5	7.2	7.9	8.5	9.2
Nephritis (all forms)	88.6	94.8	88.8	91.0	81.4	66.7	5.2	6.5	6.8	8.0	7.6	6.3
Cancer	64.0	76.2	83.4	97.4	120.0	134.5	3.7	5.2	6.4	8.6	11.2	12.7
Diabetes mellitus	11.0	15.3	16.1	19.1	26.5	26.6	0.6	1.0	1.2	1.7	2.5	2.5

* Data from "Vital Statistics Rates in the United States, 1900–1940" (Bureau of the Census, Washington, D.C. 1943) and *Public Health Reports*, Vol. 63, No. 17, Apr. 23, 1948, p. 538.

as we encounter them today have historical origins. In the next chapter a brief summary of these origins is presented.

Suggested Reading

National Resources Committee, "The Problems of a Changing Population," Washington, D.C., May, 1943.

Linder, Forrest E., and Robert D. Grove, "Vital Statistics Rates in the United States, 1900–1940," Bureau of the Census, Washington, D.C., 1943.

Thompson, Warren S., "Plenty of People," The Jaques Cattell Press, Lancaster, Pa., 1944.

Dublin, Louis I., and Alfred J. Lotka, "The Money Value of Man," The Ronald Press Company, New York, rev. ed., 1946.

Condliffe, J. B., "The Economic Pattern of World Population," National Planning Association, *Pamphlet* 18, November, 1947, Washington, D.C.

CHAPTER 4

ECONOMIC, POLITICAL, AND SOCIAL ORIGINS OF PUBLIC HEALTH

Current public health activity in the United States has its origin in the economic, political, and social changes of the sixteenth, seventeenth, and eighteenth centuries in Great Britain.

The Sixteenth Century (1500–1599). Throughout the sixteenth century, designated as the Renaissance and the Reformation, ample evidence exists of the economic, political, and social changes taking place throughout Great Britain, which were destined later to have a profound effect upon the public health. The rise of the free laborer, no longer bound by feudal ties but yet subject to unemployment and all the evils of an open labor market, laid the groundwork for the subsequent problems of ignorance, disease, and poverty. Trade was becoming of first importance. Manufacturing was beginning. These changes in the national life were accompanied by a great increase in the sovereign power of the state. Regulation of trade and the relief of the poor became subjects for the state. The state relief of pauperism, so closely related to national health, began to emerge. Population increased during the century and towns began to show marked increase in population. The result was great overcrowding, general poverty, and widespread unhygienic conditions. Sanitary problems increased in scope and intensity—water supplies were inadequate and disposal of sewage nonexistent.

Throughout the century the people were in constant fear of plague, of which there were two widespread epidemics in 1563 and 1592; of sweating sickness, the first epidemic of

which occurred in 1485 with subsequent epidemics occurring in 1507, 1528, 1551, and 1578; of typhus fever, as in the Black Assizes of Cambridge (1522), Oxford (1577), and Exeter (1586); of syphilis, which was widespread throughout the whole population; and of scurvy, which began to take a heavy toll among seamen because of the small, overcrowded ships and lack of proper food.

Attempts to deal with these diseases were confined to the use of quarantine and efforts to prevent people from crowding together during outbreaks of epidemics. Small pest-houses were built outside of the cities for the forcible isolation of cases. Experience of plague epidemics was making it clear that outbreaks arose and were more virulent in crowded and insanitary quarters.

The Seventeenth Century (1600–1699). During the seventeenth century the population continued to increase slowly, and at the end of the century the population of Great Britain was estimated at about 5½ million. About 1½ million were urban dwellers, with London, the largest city, having a population of about 500,000. Trade continued to expand. The woolen industry increased. In the north the cotton industry began and silk weaving was introduced in the east and west. Child labor was established on a regular basis. It was an age of brutality and inhumanity. The problem of poverty continued unsolved. There was lack of work, lack of food, and lack of accommodations for the poor. The diet of the people showed little change from that of Queen Elizabeth's reign. Housing conditions showed little advance. Town streets were narrow and tortuous. The increasing urban population and the large amount of poverty now combined with the persistence of the old housing conditions to increase the overcrowding in the larger cities to an unprecedented degree. "Cellar dwellings" now made their first appearance. There was little improvement in water supplies.

Epidemic plague disappeared in this century and by the end of the period epidemic diseases had changed markedly. Vari-

ous explanations for this sudden disappearance of plague have been advanced. It has been suggested that the cause of the decline was the alteration of the trade routes from overland to sea routes. Also it has been advanced that the disappearance of the plague was due to the improvement of social conditions, especially in relation to the housing of the poorer classes. Another suggestion has been that the ousting of the black rat by the brown rat accounted for the disappearance of the disease.

In addition to the passing of the plague, famine pestilences were unknown, leprosy had died out, and syphilis was no longer epidemic. Famine pestilences disappeared soon after the end of the thirteenth century owing to an improved agriculture, the use of irrigation, and a better distribution of grain. Leprosy was prevalent in England from about the tenth to the fourteenth century, and its control was largely due to the application of the principle of isolation. Syphilis ceased to be epidemic, it is believed as a result of its treatment by mercurial fumigation and inunction at the hands of the barber-surgeon.

Smallpox[1] began to assume epidemic form, "fever" was becoming more and more prevalent, outbreaks of measles and scarlet fever were occurring, and summer diarrhea carried off a large number of infants. Little advance in dealing with these diseases were made in this period. Hospital, nursing, and charitable care of the sick practically disappeared in the Protestant countries with the shift from the monastic to the secular system.

An increase in observation and experiment replaced custom and authority. The world was in a state of physical, intellectual, moral, religious, military, economic, political, and social upheaval. One after another of the old landmarks crumbled. A revolution in thought ensued in the areas of mathematics, astronomy, chemistry, and microscopy. Universities and

[1] The adjective "small" was associated with the word "pox" to distinguish the disease from the "great" pox or syphilis. See E. W. Goodall, "A Short History of the Epidemic Infectious Diseases," John Bale Sons and Danielsson, Inc., London, 1934.

scientific societies were founded, and periodic literature began to appear.

The Eighteenth Century (1700–1799). The eighteenth century saw a great extension of the scientific advances of the previous century. It was a time favorable to the spread of new ideas, although the social background was coarse and materialistic, with corruption and immorality among the upper classes and brutality and ignorance among the lower. In the minds of the chief thinkers of the period there were developing ideas which, increasing gradually in Great Britain and breaking out in France with explosive violence, were to revolutionize the social life of these countries and later of all Europe.

These thinkers taught that government could no longer be looked upon as a self-benefiting prerogative of the governors, but was rather a trust for those governed. They emphasized the importance of social welfare and contended that health, education, sanitation, hospitals, schools, libraries, and parks must no longer depend upon chance benefactions, but must be the serious business of the state. It was realized that social questions must be dealt with, that causes must be searched out and concrete results achieved, and that prevention was of more value than pity. These ideas were fanned to a flame by the Methodist revival and the crusade against slavery. This period is known in English history as the "new humanity."

Despite peace and general prosperity the health of the people was poor during the first half of the eighteenth century. The death rate was high (half the children born died before they reached the age of five) and as a consequence there was little increase in population. Five million in 1700, it was not more than 6½ million by 1750—an increase of about 30 per cent. The mean death rate for the century, which in 1750 was as much as 35 per 1,000, by 1800 had fallen to 25 per 1,000, while in most towns the birth rate had risen so as to equal and in some cases to exceed the death rate. By the end of the century there was a rapid rise in population, which

now numbered 9¾ million—an increase of 50 per cent over that of 1750.

Better urban sanitation and vigorous efforts to prevent infection diminished the widespread typhus fever in towns. The greater care taken of infant life and, at the extreme end of the century, the use of vaccination prevented many deaths in infancy and early childhood. More efficient medical treatment became available for the poor. The national dietary fluctuated less and was of improved quality. The comfort and well-being of the mass of the people was markedly increased.

The second half of the century found the public mind and conscience reoriented to a higher conception of the national duty in matters of health and hygiene. From this time on there prevailed regular improvement in sanitation, in disease prevention, and in the general standard of living, with consequent decrease of illness and poverty. A great improvement began in the personal hygiene of the people as a result of the change in clothing materials. The dress of all classes became simpler. Cotton and calico, both materials easily boiled and washed and sufficiently cheap to be renewed, began to replace wool. Linen became more common and was used for both garments and bed coverings. The use of iron bedsteads, in place of straw and wood, contributed to the sanitary improvement. There was one feature of social life at the time which reacted unfavorably on the public health—this was the inordinate consumption of alcoholic spirits among all classes, brandy among the nobility, rum among the middle classes, and gin among the poor classes.

Although plague had disappeared the bulk of the people were still dying from epidemic disease. Fevers and smallpox were the principal scourges. Scurvy and rickets were prevalent. Malaria still existed in the low-lying districts. Scarlet fever, measles, and whooping cough were becoming increasingly common. Epidemic diarrhea, due chiefly to lack of sanitation and of hygienic carelessness, carried off thousands of infants every summer and autumn.

Hygienic improvements appear to have been dictated more by the needs of growing commerce and public convenience than by any conscious attempt to conserve the public well-being. Yet there arose a school of medical hygienists who, appreciating the importance of hygienic changes to the health of the people, not only advocated these changes but by their own work played an active part in the campaign against disease. It was in their struggle against fevers and smallpox that their efforts were conspicuously displayed. These leaders were Mead, Huxham, Pringle, Lind, Baker, Howard, and Jenner, whose contributions will be noted in Chap. 6.

We have seen how the economic, political, and social trends in the sixteenth, seventeenth, and eighteenth centuries laid the groundwork for the creation of public health problems. In the following chapter the theories on etiology of diseases will be discussed.

Suggested Reading

Delmege, J. Anthony, "Toward National Health or Health and Hygiene in England from Roman to Victorian Times," The Macmillan Company, New York, 1932.

Black, J. B., "The Reign of Elizabeth 1558–1603," in "The Oxford History of England," Vol. VIII. Oxford University Press, New York, 1936.

Davies, Godfrey, "The Early Stuarts, 1603–1660," in "The Oxford History of England," Vol. IX. Oxford University Press, New York, 1934.

Clark, G. N., "The Later Stuarts, 1660–1714," in "The Oxford History of England," Vol. X. Oxford University Press, New York, 1934.

Williams, Basil, "The Whig Supremacy, 1714–1760," in "The Oxford History of England," Vol. XI. Oxford University Press, New York, 1939.

Commission on Hospital Care, "Hospital Care in the United States," Commonwealth Fund, Division of Publication, New York, 1947.

CHAPTER 5

HISTORICAL THEORIES ON ETIOLOGY OF DISEASE

Facts, principles, and historical background are needed to understand the public health problems of today. It therefore becomes necessary to examine the dominant theories concerning the causation of disease that man has advanced in his long struggle to understand disease. The practice of medicine began before the dawn of recorded history. Throughout the centuries of primitive culture, throughout the enlightened advances of ancient peoples, continuing through the years of ignorance and superstition preceding the Renaissance, and down to our own time, the *medicine man*, *priest*, *Hippocratist*, *barber-surgeon*, *empiricist*, and *scientist* have sought to relieve the sufferings of mankind.

Briefly, as Osler[1] has shown, the progress of medicine has followed certain stages in which it emerged from magic and religion into an empirical art; a stage in which the natural character of disease was recognized and the importance of its study as a phenomenon of nature was announced; a stage in which the structure and functions of the human body were worked out; a stage in which the clinical and anatomical features of disease were determined; and a stage in which the application of knowledge to the prevention of disease was elaborated.

Primitive Medicine. Garrison[2] has written that it may be taken as proved that there is a practical identity between folk-

[1] Sir William Osler, "The Evolution of Modern Medicine," Yale University Press, New Haven, 1921, p. 220. By permission.

[2] F. H. Garrison, "An Introduction to the History of Medicine," W. B. Saunders Company, Philadelphia, 4th ed., rev. and enl., 1929, pp. 17–46.

lore and primitive medicine. In the early stages of man's existence on earth the preservation of human life was dependent upon factors and conditions which still continue to regulate the situation. The basic factors of hunger, of sex, of fear, and of the security and preservation of life were then and are today the primary issues facing man. The ancient conception of the process of life was a struggle between two animistic forces—the normal state of health was governed by the soul or benevolent spirit, and disease was caused by an evil animistic force entering the body and overcoming the soul. Primitive man reacted to the concept of disease in a very definite way. He construed the natural as the supernatural, as many of us still do. Natural phenomena were evidences of offended gods, devils, demons, or malevolent spirits. Disease was an omen of the displeasure of offended forces. Primitive man also capitalized on the idea of sorcery and believed that disease might be induced by a human enemy "possessed" by supernatural powers. Finally, he looked upon disease as a result of the intervention of the will of the offended spirits of the dead.

As a result of this confusion of thought, primitive people regarded disease as an *entity* quite separate from the body and its function, an entity to be treated in accordance with the cause—by prayers, offerings, religious ceremonies, diet, or certain medicinal herbs. The medicine man held sway over primitive man. He could not reason from cause to effect.

Hebrew Medicine. In the Old Testament disease was an expression of the wrath of God, to be removed only by moral reform, prayers, and sacrifice, and it was God who conferred both health and disease. The priests acted as "hygienic police" in relation to contagious diseases. The ancient Hebrews were in fact the founders of prophylaxis. They had a definite code of ritual hygiene and cult cleanliness. The book of Leviticus contains clear and stern mandates in regard to touching unclean objects, the proper food to be eaten, and the prevention of contagious diseases. Definite common-sense directions are given in regard to segregation, disinfection,

and the old Mosaic rite of incineration of a patient's garments and other fomites. "The institution of the Sabbath day gave tired workaday humanity a sort of permanent splint to rest upon."[3]

Greek Theories. The Greeks were the earliest people to begin the break with primitive concepts of disease. During the Homeric era medicine was practiced by the priestly class, who called to their aid the gods, Apollo, Minerva, Orpheus, and Chiron. The ruling god of medicine was Aesculapius, the father of the damsels Hygeia and Panacea. Gradually, the priestly character of medicine was lost. Medical schools sprang up at Cos, Cnidus, and Rhodes. From the school at Cos came the most prominent character in medical history, Hippocrates (460–359 *or* 377 B.C.). He was among the first to rationalize medicine, to codify medical knowledge, and to establish the art of healing as one of the highest ethical and spiritual pursuits. The persistence and wide acceptance of the Hippocratic oath even today is sufficient evidence of the basic contribution of the school of Hippocrates.

Hippocrates established the principle in medicine that knowledge of disease rests primarily upon the careful observation and notation of symptoms. He gave substance to the doctrine of Empedocles (504–443 B.C.) of Sicily that matter is composed of four elements as constituent fundamentals in all bodies. These elements were fire, air, water, and earth. Fire was hot and dry; air, hot and fluid; water, cold and fluid; and earth, cold and dry. In the human body the *blood* was supposed to originate in the liver and represented warmth; *phlegm* originated in the lungs and represented cold; *yellow bile* originated in the gall bladder and represented dryness; and *black bile* originated in the spleen and represented moisture. All disease was referable to some imbalance in one or more of these four humors. The Greek word "humor" means animal fluid. The descriptive words used today to denote temperament are directly traceable to this Greek theory of

[3] *Ibid.*, p. 68.

the origin of disease: sanguine–assured, optimistic; phlegmatic –impassive, apathetic; choleric–hot-tempered, irascible; and melancholic–gloomy, depressed.

In the view of Hippocrates the patient was the important factor, the disease was not an *entity* (the primitive man's indwelling demon) but a fluctuating condition of the patient's body, a battle between the *materies morbi* (the substance of disease) and the *vis medicatrix naturae* (the healing power of nature). Hippocrates recognized that disease was only a part of the process of nature and that there was nothing divine or sacred about it.

The Greeks, between 460 and 370 B.C., made definite advances in understanding the aims of hygiene in that they: (1) disassociated science from magic; (2) built upon nature as a cause and healer of disease; (3) organized clinical observation and diagnosis of disease on induction; (4) held that life was not a habit but an experiment; (5) believed in moral inspiration; and (6) distrusted anything that could not be checked and verified.

The theory[4] of the origin of disease advanced by Hippocrates was solidified by Claudius Galen (A.D. 131–201) of Pergamum, Greece into a dogma which dominated medicine for more than fourteen hundred years. Galen based his medical theory on that of Hippocrates. He prosecuted his studies along lines of anatomy and physiology and wrote with such authority that his teachings endured without question down to the time of Vesalius, Paracelsus, and Fracastoro.

The Dark or Middle Ages. The Dark or Middle Ages are the titles given to the years covering the fifth to the eleventh century (A.D. 476–1000). All that Hippocrates and his followers had gleaned from an impassive nature, all that Galen had added to his store of information, was shrouded from view throughout this gloomy period. Man's preoccupation was to save his soul, and salvation was the main end of every

[4] It is important for the student to differentiate between *hypothesis, theory, doctrine, dogma.*

human being. The social conditions, both individual and communal, under which man lived were indescribable and today are regarded as unbelievable.

The Renaissance or Age of Reformation. In the last half of the fifteenth century certain developments laid the groundwork for the Renaissance. First and fundamental was the overpowering fear engendered by the series of devastating epidemics of bubonic plague, the black death, and syphilis that began about 1348 and continued for varying periods for more than two hundred years. The invention of printing by movable type in 1446, the introduction of the use of gunpowder about 1450, the discovery of America in 1492, the revolt of Martin Luther in 1517, the pronouncement of the heliocentric theory in astronomy by Copernicus in 1543, the renewed struggle between the masses and classes which began with Magna Carta (1215), the rise of universities as seats of learning, and the growth of vernacular literature all combined to destroy the voice of authority which had dominated man through the ages. Free thought and a critical spirit were abroad in the world.

Agreement is general that the sixteenth century marks the beginning of modern medicine.[5] It marks the beginning of emancipation from authority. The great medical names in the sixteenth century were Paracelsus, Vesalius, and Fracastoro.

Paracelsus was born near Zurich, Switzerland, the son of a physician. His real name was Aureolus Theophrastus Bombastus von Hohenheim (1493–1541). He became the Martin Luther of medicine, the very incarnation of the spirit of revolt. He doubted all ancient theories of disease. While a professor at the University of Basel in 1527 he publicly burned Galen's works, but excepted those of Hippocrates since his treatment was based on observation and experience.

Paracelsus wrote a practical treatise on surgery, authored a manual introducing mercury as a cure for syphilis, removed

[5] C. E. Kenneth Mees, "The Path of Science," John Wiley & Sons, Inc., New York, 1946.

therapy out of the realm of alchemy and made for it a chemical basis, wrote a book on miner's disease and another on mineral baths, recognized the geographic differences of disease, and introduced such drugs as laudanum, mercury, lead, sulphur, iron, arsenic, and copper.

Fig. 1. Paracelsus. (Aureolus Theophrastus Bombastus von Hohenheim, 1493–1541.) *(From the collection, New York Academy of Medicine.)*

Paracelsus taught that diseases arise from five main causes: (1) from astral entities which leave within the body imprints of changes produced by stars; (2) from entities or poisons contained in foods; (3) from natural entities controlled by astral entities; (4) from entities that are the spirits and the demons; and (5) from entities that represent the immediate effects of the acts of God upon us. Paracelsus has been characterized as the strange but true prophet of modern therapeutics as well as of clinical pharmacology.

Andreas Vesalius (1514–1564) was the most commanding

figure in European medicine after Galen and before Harvey. Vesalius was born in Brussels and studied at the University of Louvain and afterward at Paris. He then went to Padua, Italy, and became professor of anatomy at the age of twenty-

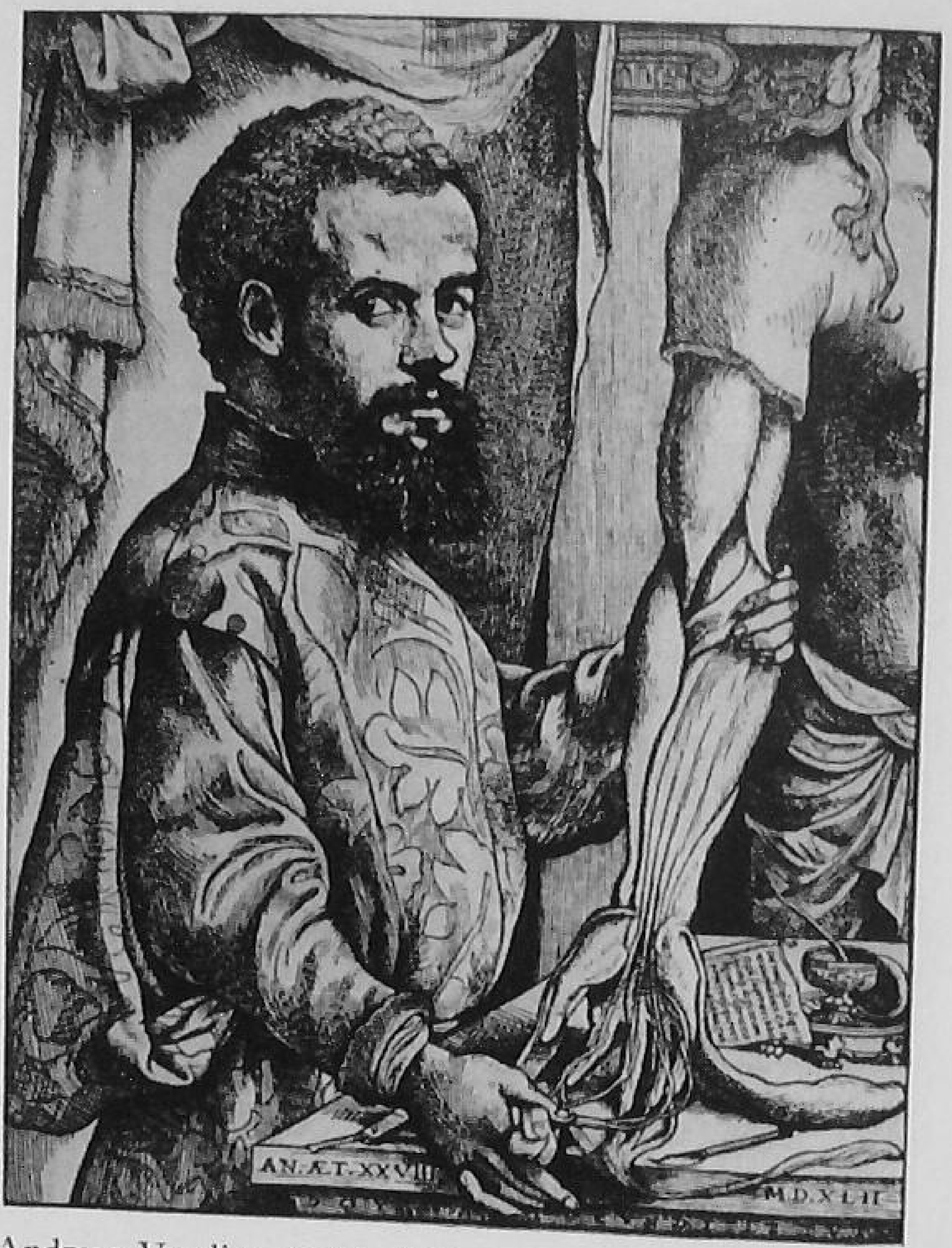


Fig. 2. Andreas Vesalius (1514–1564). *(From the collection, New York Academy of Medicine.)*

four. He soon found errors in Galen's descriptions of the human body and corrected them. In 1543 Vesalius published his great work, "De humani corporis fabrica libri septem" ("Fabric of the Human Body"), and thereby established the era of exact anatomy and experimental science. Vesalius insisted that before accurate knowledge of the workings of the human body could be understood, it was necessary to have accurate knowledge of the structure of the human body.

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Girolamo Fracastoro, also known as Fracastorius (1484–1553), was born in Verona, Italy. He completed his medical studies at Padua in 1501, and in the next year was made professor of logic at Padua. His medical fame is based upon a

FIG. 3. Girolamo Fracastoro (1484–1553). *(From the collection, New York Academy of Medicine.)*

most celebrated medical poem, "Syphilis sive morbus Gallicus" ("Syphilis or on the Gallic Disease"), published at Venice in 1530. However in 1546, again at Venice, he published another treatise, "De contagione et contagiosis morbis" ("On Contagion"). In this work Fracastoro revealed himself as the most scientific student of epidemic diseases of his time. He described typhus fever (1505), plague, and syphilis (1530), explored their origin, and traced their spread. He proposed the idea that diseases might spread by seeds (*semina-*

ria contagionum) too small to be seen by the eye, but he had no clear conception as to what they were like, nor did he have any evidence to support his theories. Fracastoro assumed that the seeds were spontaneously generated and believed that they were spread by direct contact or fomites (vehicles of infection, such as clothing and bedclothes), which carried the seeds of contagion, and by transmission from a distance through the air without direct or indirect contact, as in plague and smallpox. "There are diseases of plants," Fracastoro wrote, "which do not contaminate animals, and vice versa, animal diseases which do not attack plants; there are other diseases limited to man or to certain animals as cattle, horses, and so on. Certain diseases have a special affinity for certain individuals or certain organs." Fracastoro also held that the contagion of a putrefaction could go from one body to another, whether near or far, and that the seeds of contagion have the faculty of multiplying and propagating rapidly.

The important service of these three men to science was to dare openly to doubt the authority, not only of the ancient writers, but also of the Church. They were exponents of the experimental method in science.

In 1547 there appeared a book by Andrew Borde (1500?–1549?) entitled "The Breviarie of Health: Wherein doth follow, remedies, for all manner of sicknesses and diseases, the which may be in Man or Woman. Expressing the obscure terms of Greke, Araby, Latin, Barbary, and English, concerning Phisicke and Chirurgerie." Borde was perhaps the first writer on sanitation after the passing of the school of Salerno and perhaps the first after Hippocrates to discuss the aspect and health of the dwelling house. Discussing pestilence, he summarizes the prevailing belief, as follows:

Of the Pestilence

Epidimea is the greke word. In latin it is named Pestilencia, . . . In Englishe it is named pestilence.

The cause of this infirmitie

This infirmitie doeth come eyther by the punishment of God, eyther els of a corrupt and contageous ayre, and one man infected

with this sicknes may infect many men, this sicknes may come also with the stench of evill dirtie stretes, of Channelles not kept cleane, or standing puddles, and stinking waters, of seges, and stinking draughtes, of shedding of man's bloud, and of dead bodyes not deepely buryed, of a great company being in a little or small rome, and of many such lyke contagious ayers. . . .

A remedy

The chiefe remedy that I do know, is for every man to submit himself to God, and then to amend our living, and to flee farre from infectious places, and not to go into the company of them which be infected, or do resort to infectious persons, and to beware of the clothes, or any other thing that doth perteyne to such infective persons. Then use a good dyet in eating and drinking, and use of perfumes in your chambers and houses, goe not abroad in the open ayre, late in the night, nor ryse not early in the morning, let the sunne have dominion over the ground, to wast & consume all contagious mistes, and ayres or you aryse, and then aryse and serve God which doth geve health to all men.[6]

These quotations give a clear picture of the state of thought on epidemic diseases prevailing at the close of the sixteenth century and offer a clue to the source of many of our popular beliefs today.

Seventeenth Century (1600–1699). In the transition from medieval to modern medicine there were three contributions from general science that had a profound effect upon the ideas and facts guiding the men who were engaged in unraveling the secrets of nature. First, Galileo Galilei (1564–1642), the Italian physicist and astronomer, in his experiments from the leaning tower of Pisa on the rate of acceleration of falling bodies, demonstrated in 1589 the error of the Aristotelian view that the rate of fall was a function not of the weight of the object but of the period of fall. Galileo made accessible two important instruments, the telescope (1609) and the mi-

[6] S. G. Blaxland Stubbs and E. W. Bligh, "Sixty Centuries of Health and Physick," Sampson Low, Marston & Co., Ltd., London, 1931, pp. 113–114. By permission.

croscope (1610). Since the time of Galileo science has come to be regarded more and more widely as an exact process—measurement. Galileo established the *method* of research.

Second, Francis Bacon (1561–1626), Lord Verulam, the English philosopher and statesman, furnished medicine an invaluable instrument when he perfected the *inductive* method of reasoning. Bacon pursued the idea of organizing a system for the investigation of nature by observation and experiment, as opposed to slavish acceptance of tradition. In 1605 Bacon published his "Advancement of Learning" and in 1620 his "Novum Organum" ("New Atlantis").

Third, René Descartes (1596–1650), the French philosopher and scientist, held that all the processes of life might go on without conscious thought and that vital activity was of a purely material character. He asserted that animals were merely self-acting machines, while man was a similar machine with a soul behind it.

With the contributions of these three pioneers in the fields of exact measurement, the inductive method of reasoning, and scientific philosophy, there began a series of discoveries concerning man and his place in nature that laid the groundwork for all subsequent scientific investigations. In addition, the enactment of the Elizabethan Poor Law in 1601 began the long series of social legislation in England that has characterized a changed conception of the relation of the state to the individual. The rise of scientific societies began in 1603 with the Academy at Rome, and these spread throughout Europe. The Royal Society of London[7] was chartered in 1662 and began its *Philosophical Transactions* in 1664. These societies became the centers of intellectual, social, and scientific activity. Another development took place when the City of London began, in 1603, to publish regularly the Bills of Mortality, in which the causes of death were recorded. These furnished the raw materials for the application of mathematics that set in motion vital statistics.

[7] Dorothy Stimson, "Scientists and Amateurs—A History of the Royal Society," Henry Schuman, New York, 1948.

Just as Vesalius in the sixteenth century marked the dividing line between ancient and modern anatomy (structure), so in the seventeenth century William Harvey performed the same service in physiology (function). William Harvey (1578–1657), the English physician, published his historic work on

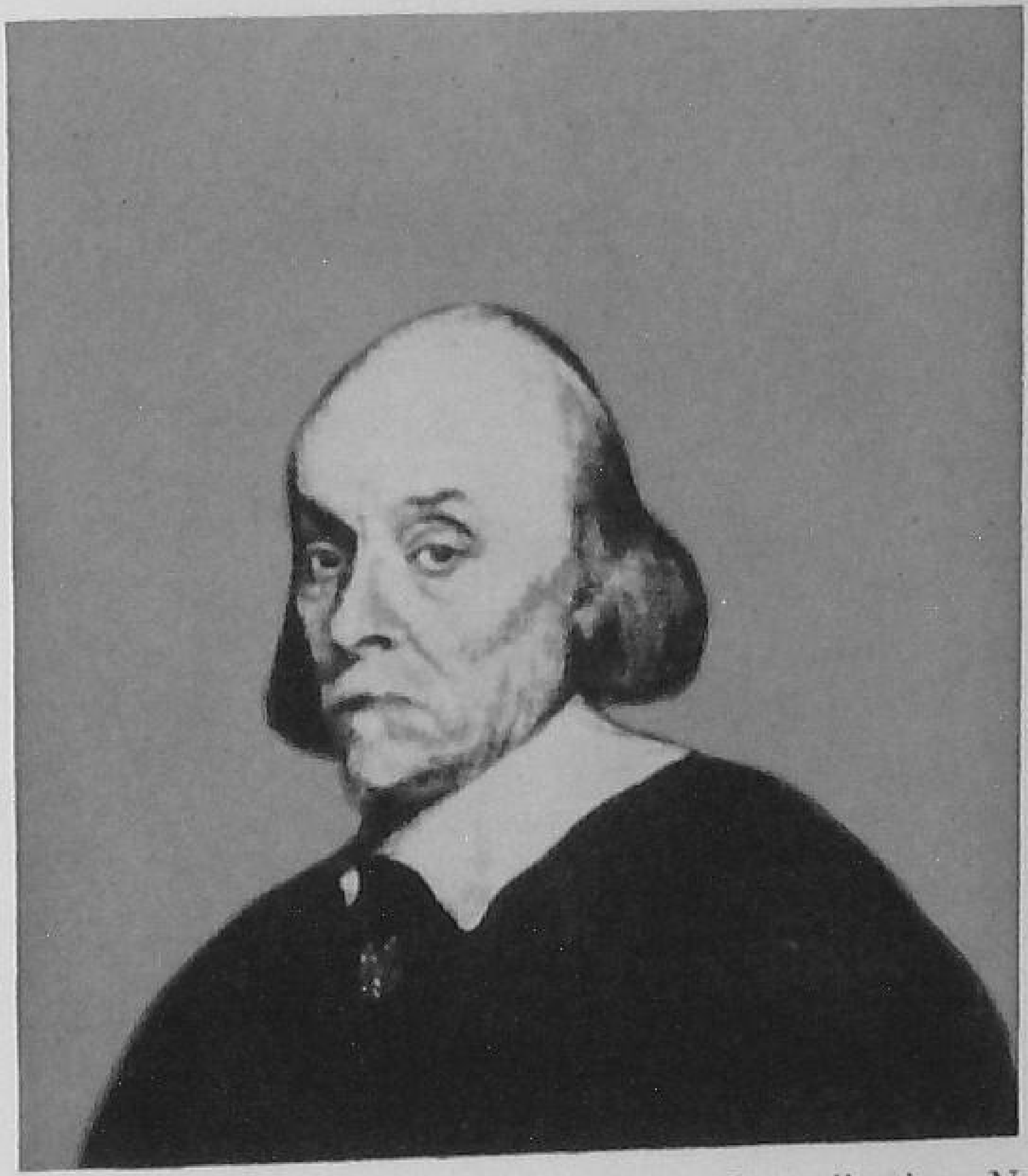

FIG. 4. William Harvey (1578–1657). *(From the collection, New York Academy of Medicine.)*

the circulation of the blood in 1628 under the title of "Exercitatio anatomica de motu cordis et sanguinis in animalibus" ("Anatomical Exercise on the Motion of the Heart and Blood in Animals"). He showed that the valves in the veins would permit the blood to pass only toward the heart, while those in the great arteries arising from the heart would permit the blood to pass only away from the heart. Harvey held that the movement of the blood must be *continuous and always in one direction.* In other words, the blood circulates and the heart is a pump. The knowledge of the circulation of the

blood forms the basis of the whole of modern physiology and with it the whole of modern rational medicine.

It was not until 1660 that the complete understanding of the circulation of the blood was established. Marcello Malpighi (1628–1694), the Italian microscopist, born in the year

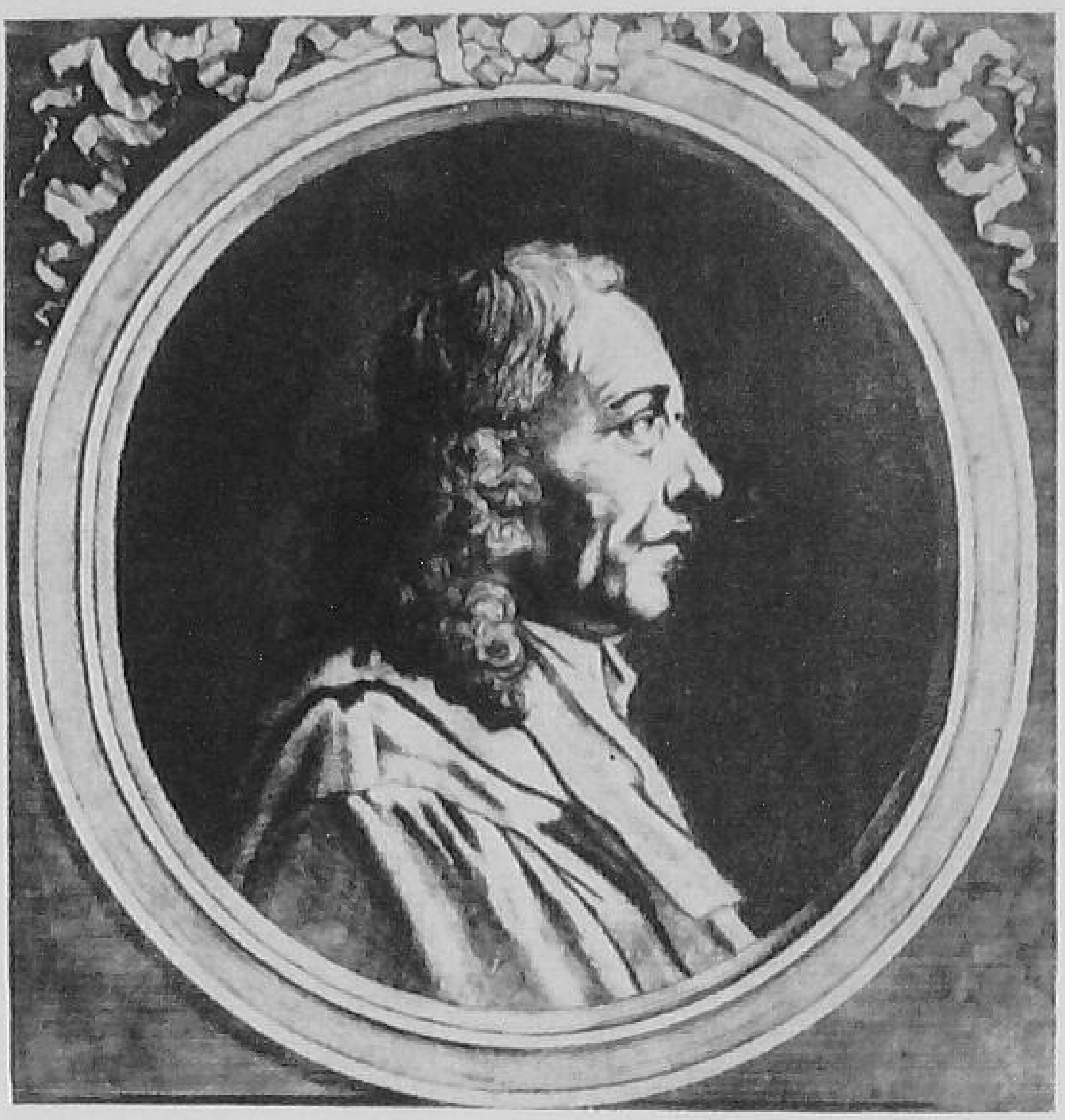

Fig. 5. Marcello Malpighi (1628–1694). *(From the collection, New York Academy of Medicine.)*

Harvey published his work, supplied the missing element. Malpighi in 1661 published his great work "De pulmonibus" ("On the Lungs"), in which he demonstrated the tiny vessels connecting the arterial and venous systems and the passage of the blood through the capillaries of the lung. He threw light upon the problems of where structure and function merge.

The method of observation and experiment on which the work of Harvey and Malpighi was founded soon began to affect the actual practice of medicine.

Thomas Sydenham (1624–1689) of Wynford Eagle, in

Dorsetshire, England, the greatest physician of his time, voiced the seventeenth-century thought with his dictum "true practice consists in the observation of nature, these are finer than any speculation." He was called the "English Hippoc-

FIG. 6. Anton van Leeuwenhoek (1632–1723). *(From the collection, New York Academy of Medicine.)*

rates" and believed "a disease nothing more than an effort of nature to restore the health of the patient by the elimination of the morbific matter." Sydenham was the first great epidemiologist.

A further elucidation of the problems confronting the physician came with the work of a layman, Anton van Leeuwenhoek (1632–1723) of Delft, Holland who was the first to use the microscope systematically. He improved and extended the knowledge of the capillary circulation, discovered earlier by Malpighi. Leeuwenhoek produced drawings of the blood

corpuscles (1674), of spermatozoa (1675), and of striped muscles (1679). In 1683, he was the first to see and to accurately describe protozoa. These he called "animalcules" (little animals). He was the first of the "microbe hunters." Although the possible relation of the "little animals" to disease was not suspected by van Leeuwenhoek, it was not until the next century that such relationship was illustrated.

Advances in mathematics also contributed to the increasing desire for exactitude. John Graunt (1620–1674), a draper of Cornhill, England, first applied mathematical methods to existent data of births and deaths which had been accumulating in England since 1603. In 1662 he published "Natural and Political Observations . . . Made upon the Bills of Mortality" and thus founded vital statistics. Graunt noted that certain vital phenomena are regular—that the population could be estimated from an accurate death rate; that normally the urban death rate exceeds the rural death rate; that mortality rates are highest in the early and late years of life; and that male exceed female births but females constitute approximately one-half of the population. He constructed the first London Life Table.

Eighteenth Century (1700–1799). The eighteenth century was one of turmoil. The French and American revolutions occurred, in which there was an effort to make life more rewarding for wider segments of the population. In the sciences there was a renewed stimulus to experiment and to search for new facts. New inventions of instruments of measurement and precision were numerous during this period. In 1711 John Shaw invented the tuning fork; in 1714 Fahrenheit constructed the thermometer; in 1726 Stephen Hales made the first measurement of the blood pressure, and between 1743 and 1758 he wrote extensively on ventilators; between 1760 and 1767 Benjamin Martin improved microscopes; in 1765 James Watt invented the steam engine; and in 1780 Benjamin Franklin invented bifocal lenses. Chemistry advanced toward a more exact understanding of the elements

–carbon dioxide was discovered by Black in 1757, hydrogen by Cavendish in 1766, nitrogen by Rutherford in 1772, and oxygen by Priestley and Scheele in 1771.

It was Antoine Laurent Lavoisier (1743–1794), the brilliant French chemist, who discovered the true composition of respired air. He showed that both carbon dioxide and water were normal products of the act of breathing and were produced by the process of oxidation in the lungs.

These discoveries gave the death blow to the "phlogiston theory" and laid the foundations for the knowledge of the physiology of respiration. Advances were made in the understanding of electricity with the discoveries of Galvani and Volta. Carolus Linnaeus (1707–1778), the Swedish botanist brought forth his basic classification of plants and animals.

In medicine the eighteenth century was the period of "theoretical systems," in which disease was attributed to either chemical or mechanical aspects of the body. One of the systematists was Georg Stahl (1660–1734) of Germany, who believed the special function of the body was to house the soul, or "anima." When the body is diseased, the symptoms are the efforts of the "anima" to free itself from morbid influences and to restore normal functions in the organism. Friedrich Hoffmann (1660–1742) of Germany, another systematist, sought to reconcile the "spiritual" and "material" theories of health and disease. He believed that life depended upon a universally diffused ether in the atmosphere. Man breathed in this ether, which pervaded the entire body. Health was based upon the maintenance of a proper body "tonus," a composite of regular action and reaction, contraction and relaxation. These solid parts of the body and these forces were regulated by a hypothetical agent which Hoffmann called "nerve fluid."

The greatest of the systematists was Hermann Boerhaave (1668–1738), born in Holland and a graduate of the Dutch University at Leiden. He was an avowed follower of Hippocrates and Sydenham. Boerhaave taught that theories of medicine should proceed out of the examination of the patient

and that consideration of the disease should lead to the construction of theories. He was an eclectic, choosing the most appropriate contributions from each of the theoretical systems.

William Cullen (1710–1790) of Edinburgh attempted a classification of disease based upon a natural-history plan. John Brown (1735–1788) established what came to be known as the Brunonian system based upon the property of excitability.

Just as Vesalius set the foundations of modern anatomy in the sixteenth century and Harvey performed the same service for physiology in the seventeenth century, so in the eighteenth century we find the beginnings of pathology and histology.

Modern pathology began with the work of Giovanni Battista Morgagni (1682–1771) of Forli, Italy. In 1761 he published at Venice his great book "De sedibus et causis morborum" ("On the Sites and Causes of Disease"), based upon about seven hundred autopsies. Morgagni relied upon naked-eye examination of the organs of the body. He thought in terms of organs as the seat of disease. At the end of the century, Marie François Xavier Bichat (1771–1802), born at Thoirette, France, a student of medicine at Lyon and a practitioner in Paris, introduced a new concept into man's ideas of the nature of disease. In 1799–1800 Bichat published his "Treatise on Membranes," in which he established histology by locating disease in the tissues of the body.

Another important advance came when Leopold Auenbrugger (1722–1809) published his "Inventum novum" ("New Invention") in 1761, in which he inaugurated the art of physical diagnosis with his discovery of percussion—the determination of the internal condition of the human body, especially the thorax by the varying resonance of the sounds produced by thumping the cavity.

The end of the century witnessed the greatest contribution in the work of Edward Jenner (1749–1823). Jenner was born at Berkeley, Gloucestershire, England, and became a pupil of

Fig. 7. Giovanni Battista Morgagni (1682–1771). *(From the collection, New York Academy of Medicine.)*

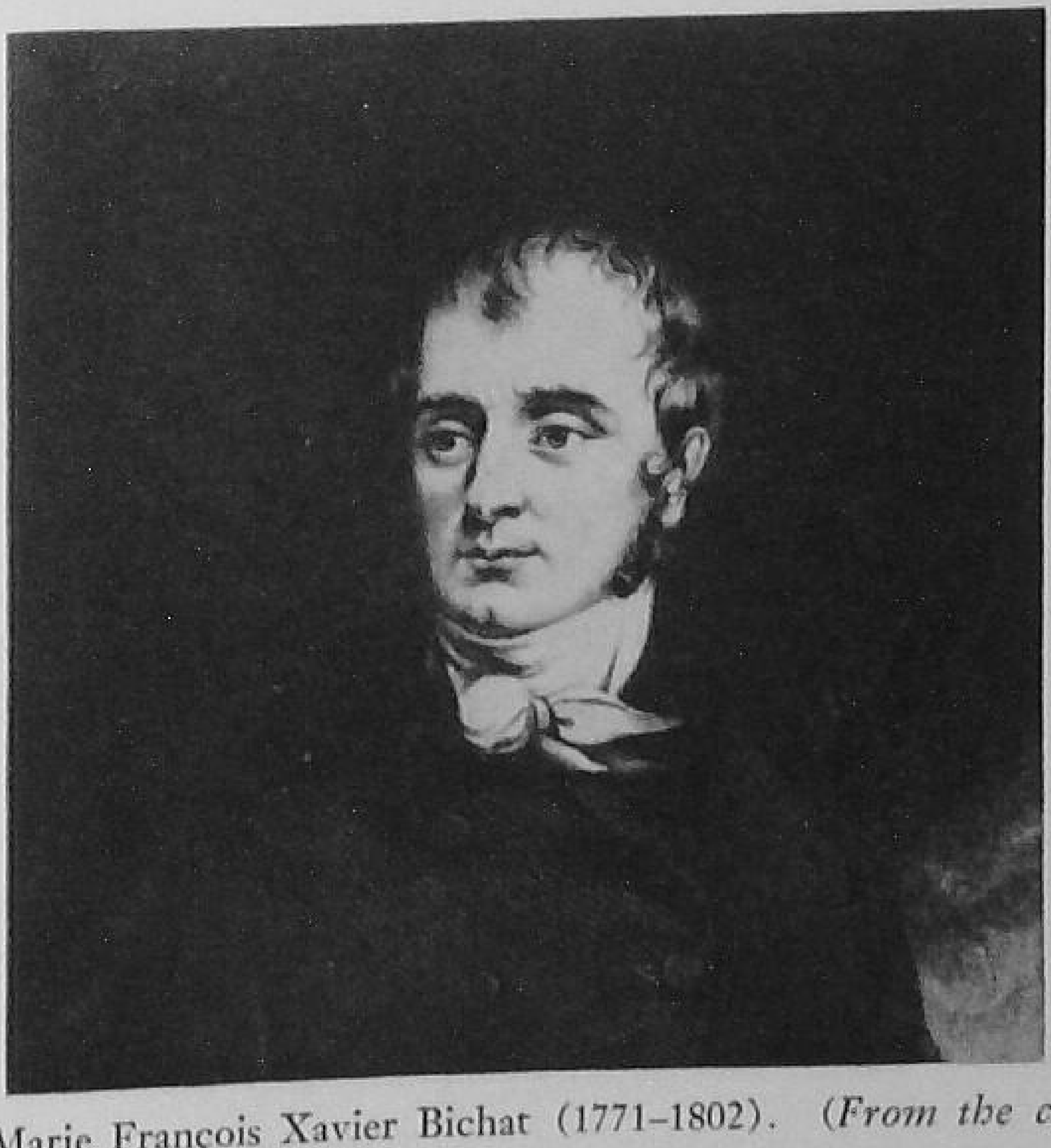

Fig. 8. Marie François Xavier Bichat (1771–1802). *(From the collection, New York Academy of Medicine.)*

John Hunter in London. In 1773 Jenner took up the practice of medicine at Berkeley. He became interested in smallpox through the statement of a dairy maid, who said, "I can-

Fig. 9. Edward Jenner (1749–1823). *(From the collection, New York Academy of Medicine.)*

not take the smallpox because I have had the cowpox." Jenner's first experiment in vaccination (the word vaccination is derived from *vacca*, a cow) was made on May 17, 1796, when he inoculated James Phipps, a boy of eight years, with cowpox. After the boy's recovery, Jenner inoculated him with virulent smallpox virus and the boy failed to contract smallpox. In 1798 Jenner first published his immortal book "An Inquiry into the Causes and Effects of the Variolae Vac-

cinae, or Cow Pox." In 1799, and again in 1800, Jenner published further observations. Jenner's three treatises constitute the first proof ever advanced that a highly contagious disease such as smallpox is preventable by conveying a closely allied disease, cowpox, to man. This marks the beginning of the science of immunology.

Throughout the eighteenth century the ideas of disease were based upon the humoral pathology. The main consideration was to cure disease without first having a clear understanding of the nature of disease itself. The teachings of Sydenham on the distinct disease entities were forgotten, and the trend was to think in terms of only one basic condition or disease. This led to a main dependence upon bloodletting as a specific means of treatment. Of hygiene, little can be said. Expectation of life was short—"A man of fifty was as rare then as a man of eighty today."

Nineteenth Century (1800–1899). The first half of the nineteenth century exhibited a continuation of medical ideas of the eighteenth century. But developments in physics, chemistry, and mathematics, as well as economic, political, and social thinking, were laying the groundwork for a further understanding of the forces controlling man in his relation to nature. Some of the early contributions of *physics* were the statement of the atomic theory by Dalton in 1804, the invention of the steamboat by Fulton in 1806 and of the electric telegraph by Soemmering in 1809, the steady improvement in the acromatic microscope between 1827 and 1830, and the treatise on the conservation of energy by von Helmholtz in 1847.

Chemistry forged ahead with the isolation of morphine by Sertürner in 1805, the patented process of canning food by Appert in 1810, the artificial synthesis of urea by Wöhler in 1827, the experiments on gastric digestion by Beaumont in 1833, the obtaining of pure chloroform by Dumas in 1834, the discovery of pepsin by Schwann in 1835, and the introduction of ether anesthesia by Morton in 1846.

The application of mathematics to medical, social, and vital statistics made for more definite understanding of the problems of disease and population. In 1801 the first national census was taken in England. In 1815 Milne constructed the Carlisle (mortality) table; in 1835 Louis founded medical statistics; in 1836 Quételet founded social statistics (demography); in 1839 Farr established vital statistics based upon the registration of births and deaths act in England passed in 1836; in 1839 the American Statistical Association was founded, and in 1843 Farr constructed his life table.

In the application of medical ideas to hygiene there were a number of significant developments during the first half of the nineteenth century that were to point the way to future discoveries. In 1800 Benjamin Waterhouse of Boston introduced the practice of vaccination into the United States; in 1801 Philippe Pinel of Paris began the reformation of the treatment of the insane; in 1802 the first marine hospitals were established at Norfolk, Va., and Boston; in the same year London established the first "fever" hospital; in 1807 England abolished the slave trade; in 1811 F. L. Jahn popularized gymnastics in Germany; in 1813 Pehr Henrik Ling introduced the Swedish movement in therapy; in 1822 London established a regular public water supply; in 1829 James Simpson constructed the first water filter in London; in 1831 high-pressure hot-water heating was introduced; in 1834 England passed the Poor Law Amendment Act; and in 1850 Thomas Way demonstrated purification of sewage through fertilization of the soil.

This review of the medical and social ideas, facts, and individual contributions to an understanding of man and his place in nature in ancient, medieval, and modern civilization forms the basis of community health education. In the next chapter, on the beginnings of organized public health, we shall see the practical application of the apparently isolated ideas and facts to an attack upon disease as one of the major problems confronting man.

Suggested Reading

Singer, Charles, "A Short History of Medicine," Oxford University Press, New York, 1928.

Oliver, Wade W., "Stalkers of Pestilence," Paul B. Hoeber, Inc., New York, 1930.

Sigerist, Henry E., "The Great Doctors," W. W. Norton & Company, New York, 1933.

Castiglioni, Arturo, "A History of Medicine," Alfred A. Knopf, Inc., New York, 1941.

Mees, C. E. Kenneth, "The Path of Science," John Wiley & Sons, Inc., New York, 1946.

Shryock, Richard H., "The Development of Modern Medicine," Alfred A. Knopf, Inc., New York, 1947.

Cohn, Edwin J., "Research in the Medical Sciences," in "Medicine Today," Columbia University Press, New York, 1947, pp. 70–121.

Pledge, H. T., "Science Since 1500–A Short History of Mathematics, Physics, Chemistry and Biology," Science Museum of London Ministry of Education, reprinted 1947.

CHAPTER 6

BEGINNINGS OF ORGANIZED PUBLIC HEALTH WORK

There is evidence that the age-long endeavor of man to understand disease and the ever-changing economic political and social conditions under which man has lived from time to time have all contributed to the present-day position of public health work. It becomes necessary to review the ideas that have been found useful in the development of man's knowledge of the art and science of medicine, to understand our social evolution, and to examine the beginnings of preventive medicine.

Throughout the struggle of man to control disease, and especially epidemic disease, are to be found the beginnings of modern public health procedures and practices. Superstition has always colored man's ideas and thinking. The struggle between magic and science down to our own times is bound up in the slow triumph of science.

Foreshadowing of Germ Theory of Disease. The five concepts which man has advanced as an explanation of epidemic disease have been: (1) the wrath of gods; (2) the general epidemic constitution (celestial and atmospheric influences); (3) local miasmatic conditions due to climate, season, and organic decomposition; (4) contagion; and (5) variations in individual vital resistance. While the idea of contagion may be traced to practices of primitive peoples, yet much of our knowledge of bacteriology and germs is due to speculative discussions during the early centuries about *spontaneous generation* as an explanation for the origin of life. This belief

held that living things were spontaneously generated from nonliving material. Early Hebrew, Greek, and Roman philosophies accepted the popular belief that new generations of animals and plants—continually and as a regular, everyday occurrence—sprang into existence by the sudden transformation of the lifeless substance of dead animals and plants.

Athanasius Kircher (1602–1680) of Fulda, Germany, was probably the first to employ the microscope in investigating disease. He was undoubtedly the first to state in definite terms, in his "Scutinium pestis" published at Rome in 1658, the doctrine of a *contagium animatum*, or *living contagion*, as the cause of infectious disease.

But it was Francesco Redi (1626–1697) of Arezzo, Italy, who delivered the first solid blow in 1668 to the doctrine of spontaneous generation or abiogenesis. He refuted experimentally the idea that maggots develop spontaneously on decaying matter.

It has been seen that van Leeuwenhoek in 1683 found microorganisms in the scrapings of his teeth and gave for the first time accurate pictures of bacterial chains and clumps as well as of individual spirilla and bacilli. He called the minute living bodies "animalcules." He has been called the first of the microbe hunters.[1]

In 1775 the Abbot Lazaro Spallanzani (1729–1799) of Scandiano, Italy, made the next advance when he disproved "spontaneous generation" and proved that living material such as "animalcules" always originate from other living material. He proved that there was law and order in the science of animals as there was in the working of the stars.

The first to formulate the germ theory of disease in anything like its modern form was Marcus Anton Plenciz (1705–1786), a Vienna physician who, in his tract on "Scarlatina" in 1762, advanced the idea of *contagium vivium* with a different living *contagium* for each disease in man, animals, and plants. From Plenciz on the *contagium vivium* doctrine was

[1] Paul de Kruif, "Microbe Hunters," Harcourt, Brace and Company, Inc., New York, 1926.

associated with theories of fermentation, decomposition, and spontaneous generation.

The relationship of these "living animalcula" to disease remained hidden until 1837, when Agostino Bassi (1773–1856), an Italian, established the proof by showing that silkworm disease (muscardine) was due to the presence of microorganisms. But it was not until 1840 that Jakob Henle (1809–1885), a German histologist, in his essay "On Miasms and Contagia," presented the first clear statement of the idea of *contagium animatum*.[2] The modern science of bacteriology may be said to begin with this great work.

These, then, are the major ideas advanced to explain the phenomena associated with the epidemic diseases, and it is upon this foundation that Pasteur later gave the convincing experimental basis to the "germ theory." While these speculations and experiments were engaging the attention of the medical men, ideas in the economic, political, and social interests of society were undergoing equally striking changes.

Humanitarian Movement in Great Britain. As had been indicated (Chap. 4) the origins of economic, political, and social change in Great Britain were laid in the sixteenth, seventeenth, and eighteenth centuries. These changes were all in the direction of improving the health and social condition of the common people.

These disease-producing conditions were closely associated with the industrial revolution in England. The revolution consisted in the invention and the utilization of machinery driven first by water and later by steam power. This process resulted in the employment of many workers in factories and workshops and in the destruction of the domestic industries which were spread throughout the land. The textile industry, which, after agriculture, was the most important in the country, was the industry chiefly affected before

[2] C.-E. A. Winslow, "The Conquest of Epidemic Disease," Princeton University Press, Princeton, N.J., 1943, gives the best consecutive account of the development of ideas on this subject.

1830. The manufacture of textiles was transferred to the sources of power. Towns grew up without plan. Houses and factories were built without supervision or regulation, and great masses of people gathered together without regard to health or comfort. Soil, air, and water were polluted without restriction. The movement from rural to urban conditions was rapid and continuous. Everything was sacrificed to the production of wealth and to the belief in the prevailing philosophy of individualism—*laissez faire, laisser aller.*

The last half of the eighteenth century and the first half of the nineteenth century witnessed the slow but sure attack upon the disease-producing conditions under which the people lived. Environmental sanitation was firmly established.

One of the factors in this attack was the growth of the "humanitarian" movement,[3] which had its beginning in the rise of John Wesley and Methodism as early as 1738, the work of John Howard in the gaols of England in 1774, the movement for the abolition of slavery led by Wilberforce in 1787, reform of the criminal law by Romilly begun in 1808, the parliamentary reform movement in 1819, and the factory agitation headed by Lord Ashley in 1833.

In each of these movements the leaders resorted to the use of organizations created to carry on a nationwide propaganda against economic, political, and social conditions which were seen as hindrances to the life of the nation. It is here that we find the modern beginnings of the use of community health education[4] in the solution of problems and situations that affect the health of the people.

[3] Iago Galdston, "Humanism and Public Health," *Bulletin of the History of Medicine*, Vol. VIII, 1940, pp. 1032–1039.

[4] Winslow in his "The Conquest of Epidemic Disease" goes back to the tractates of the Black Death (p. 98): "The literate, both medical and lay, sought for rational explanations of these calamities. On the medical side, such explanations were put forth in a great number of plague tractates explaining to the public the causes of the epidemics and the symptoms and treatment of the disease. These tractates offer perhaps the first large-scale examples of popular instruction in the field of public health."

Beginnings in Preventive Medicine. Despite restrictions placed upon medical practitioners by the "theoretical systems of medicine," it was evident in the eighteenth century that certain areas in preventive medicine were being explored and established. These areas dealt with puerperal sepsis, diseases of occupations, plague, scurvy, lead colic, gaol fever, and smallpox.

Puerperal Sepsis. In the prevention of puerperal sepsis, contributions to its understanding were made by Charles White (1728–1813) of Manchester, England, in 1773; Oliver Wendell Holmes (1809–1894) of Boston, Mass., in his essay "The Contagiousness of Puerperal Fever," published in 1843; and Ignaz P. Semmelweiss (1818–1865) of Budapest, Hungary, who published his book on "Aetiology, Concept and Prophylaxis of Childbirth Fever" in 1861—all of whom on either a theoretical or an experimental basis advanced the idea that care and cleanliness in obstetrics would reduce the high mortality rates.

Diseases of Occupations. Two men, widely separated in space and time, made distinct contributions toward clarifying the factors underlying diseases of occupations. Bernardino Ramazzini (1633–1714) of Modena, Italy, was the pioneer in this field. His book "Diseases of Artificers" ("De morbis artificium diatriba") was published in 1700. He was followed by Charles Turner Thackrah (1795–1833) of Leeds, England, who made a detailed study of the effects of occupations on health and longevity. His work was published in 1832 under the title of "Effects of Principal Arts, Trades and Professions."

Plague. In 1720 plague raged in Marseille. It is said that the disease caused 60,000 deaths. Memories of the epidemic of plague in 1665 were still fresh in the English mind. The English government began to be alarmed. There was widespread doubt of the effectiveness of the quarantine of ships, the burning of great fires in the streets, and the hounding of beggars. The Secretary of State wrote Dr. Richard Mead (1673–1754), a leading practitioner in London, asking for

advice on how to stem the epidemic. Mead, in 1720, wrote a pamphlet entitled "A Short Discourse Concerning Pestilential Contagion and the Methods to be used to Prevent it." This pamphlet, extended later into a book, marks the beginning of the English public health system. Mead believed the plague contagious and recommended isolation of patients outside the city limits, strict quarantine, the establishment of a central council of health with local officials, prompt reporting of cases, and individual and community cleanliness.

Gaol Fever. John Howard's (1726–1790) work in prison reform is regarded as the initial impetus given to the development of the modern public health movement. Howard was born in Hackney, London, the son of a wealthy upholstery and carpet merchant. In 1773 Howard was appointed High Sheriff of Bedfordshire and began his investigations into the condition of the town and county gaols, which continued into the next year. In 1774 he testified before Parliament as to what he had seen in the gaols of England. He was horrified by the abominable conditions he found in the gaols, especially the filth and gaol fever (typhus). As a result of his report Parliament passed an act for the abolition of the fee system of paying gaolers and another act for the betterment of the sanitary conditions of prisons.

During the next two years Howard visited prisons in Great Britain and on the Continent, and in 1777 he published his observations in a volume entitled "The State of Prisons in England and Wales." His recommendations for the correction of the evils he saw were: (1) cleanliness; (2) fresh air; (3) adequate diet; (4) separation (isolation); and (5) attention (better administration).[5]

Later, Howard's interest widened from the gaols and gaol fever, and he turned to the problems of disease prevention. He visited the great European hospitals and published in 1789 careful notes and suggestions for the improvement of hospitals in England. These suggestions were embodied in "An

[5] Howard's recommendations remind one today of the basic social program of attack upon tuberculosis.

Account of the Principal Lazarettos in Europe." While in Russia studying prison conditions he contracted fever and died at Kherson, where he was buried. The evils Howard saw that needed correction were the widespread prejudice

FIG. 10. John Howard (1726–1790). (*From the collection, New York Academy of Medicine.*)

against the washing of floors and walls, fear of admitting fresh air, the rarity of bathing; the offensiveness of the air in the hospital wards, especially at night, the vast amount of alcoholic drinking, and the lack of convalescent wards or places for the patients to go after discharge from the hospitals.

Howard's contribution to the public health movement lay in his systematic use of two of the chief modern means of ascertaining evils—*inspection* to ascertain the exact circumstances and conditions and *reporting* with statistical summaries of ascertained facts.

Scurvy. Elaboration of the ideas for the prevention of scurvy—a deficiency disease—came from John Huxham (1692–1768) of Totnes, Devon, England, who in 1747 recommended that 1,200 sailors of Admiral Martin's fleet who had been disabled by scurvy be put upon a vegetable diet. In 1754 James Lind (1716–1794), a native of Scotland, urged the use of preserved orange and lemon juice through his first published work on "Scurvy." Through Lind's influence Admiral Watson used lemon juice for his crew in 1757. In 1782 Sir Gilbert Blane (1749–1834) cured an outbreak in twenty-eight ships of the line by means of fresh lemons, limes, and oranges. He recommended lime juice in his "Observations on the Disease of Seamen" published in 1785.

Devonshire Colic. In 1739 Huxham described Devonshire colic (from cider drinking) without ascertaining its true cause. Similar observations were made by Theodore Tronchin (1709–1781) of Geneva in his "De colica Pictonum" published in 1757, in which he showed that "Poitou colic" was caused by water poisoned from passing through the gutters of lead roofs, and by Thomas Cadwalader (1708–1779) of Philadelphia, who described lead colic and lead palsy and attributed them to the habitual use of Jamaica rum distilled through leaden pipes. This was discovered in 1767 by Sir George Baker (1722–1809), another Devonshire man, who noticed that the cider-time colic endemic in Devonshire was somehow correlated with large pieces of lead used in the vats and cider presses which were not so used in other counties of England. Baker published "An Essay Conserning the Cause of the Endemic Colic in Devonshire" in 1767 advancing his thesis.

Vaccination—Smallpox. The use of vaccination as a preventive of smallpox was introduced by Edward Jenner (1749–1823) of Gloucestershire, England, in his publication in 1798 entitled "An Inquiry into the Causes and Effects of the Variolae Vaccinnae . . . known by the name of Cow-pox." This discovery has been marked as one of the greatest triumphs in the history of medicine.

Scientific Contributions. A new direction was given to man's outlook upon life and disease by René Théophile Hyacinthe Laënnec (1781–1826) of Brittany, France, who invented the stethoscope May 1, 1819, and published in the same year his classic "Traité de l'aucultation médiate" ("A

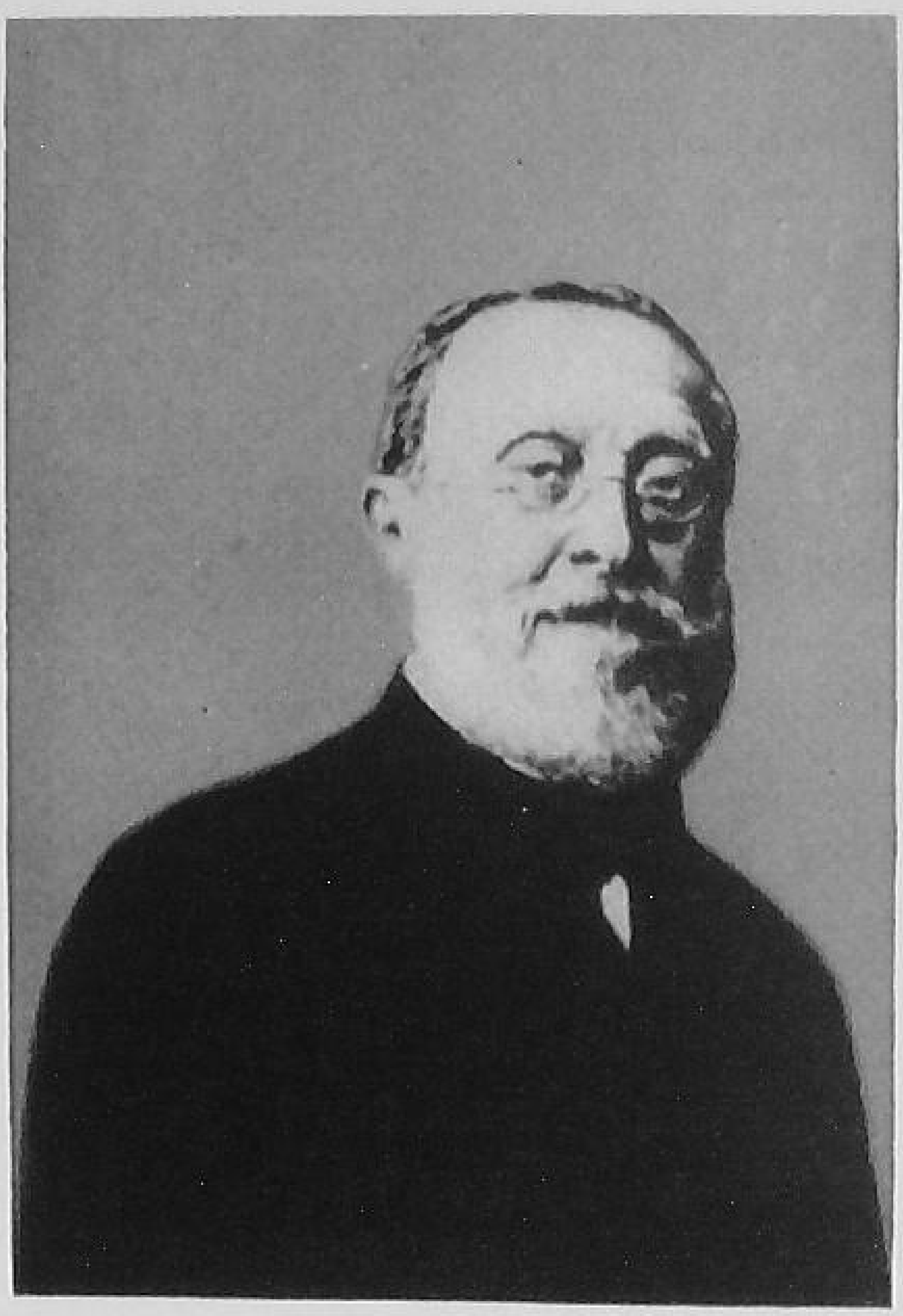

Fig. 11. Rudolf Virchow (1821–1902). (*From the collection, New York Academy of Medicine.*)

Treatise on Mediate Auscultation"); by Pierre Charles Alexandre Louis (1787–1872) of Paris, who did more than anyone else to overthrow the theorizing systematists in his foundations of medical statistics dealing with phthisis (1825) and typhoid fever (1829); by Hermann von Helmholtz (1821–1894) of Potsdam, Germany, in his essay on the "Conservation of Energy" published in 1847, in which he established the first law of thermodynamics: that all modes of energy are capable of transformation from one to the other but otherwise indestructible and impossible of creation; by Louis Pas-

teur (1822–1895) of Dôle, France, in his study of ferments in 1857, in which he showed the necessity of the presence of microorganisms in the processes of fermentation; by Rudolf Virchow (1821–1902) the German pathologist who published his "Cellular Pathology" in 1858, in which he described the body as a "cell-state in which every cell is a citizen" and disease as a "conflict of citizens in that state brought about by the action of external forces"; and finally by Charles Robert Darwin (1809–1892) of Shrewsbury, England, who developed his theory of evolution and wrote "On the Origin of Species by Means of Natural Selection" in 1859—perhaps the most wonderful piece of synthesis in the history of science. Darwin changed human thought on a scale never equaled in the history of ideas. He forced upon man an awareness that he was a part of nature and obeyed natural laws of heredity, of variation, of natural selection, and of his environment.

These basic and scientific contributions initiated the present scientific view of man's position in nature, and both medicine and public health were given a scientific foundation.

In the next chapter the basic contributions to the modern public health movement will be discussed.

Suggested Reading

de Kruif, Paul, "Microbe Hunters," Harcourt, Brace and Company, Inc., New York, 1926.

Newsholme, Sir Arthur, "The Story of Modern Preventive Medicine," The Williams & Wilkins Company, Baltimore, 1929.

Newman, Sir George, "The Rise of Preventive Medicine," Oxford University Press, New York, 1932.

Smith, Geddes, "Plague on Us," Commonwealth Fund, Division of Publication, New York, 1941.

Winslow, C.-E. A., "The Conquest of Epidemic Disease," Princeton University Press, Princeton, N.J., 1943.

CHAPTER 7

BASIC SCIENTIFIC CONTRIBUTIONS TO MODERN PUBLIC HEALTH MOVEMENT

The period between 1832 and 1877 marks a distinctly new method of viewing life and its processes. This new view had tremendous influence upon the development of the modern public health movement. The slow accumulation of ideas and facts over several centuries now sprouted forth into a series of contributions that gave explanations to many mooted questions.

Social Reorganization in England. Twenty years of national depression in England followed the successful conclusion of the French War in 1815. This resulted in a temporary lull in hygienic progress. The general shortage of money, widespread social unrest, and the enormously rapid increase of the urban population combined to exercise an adverse effect upon sanitary efforts. Stimulated by public alarm at the outbreaks of cholera, by the influence of Jeremy Bentham and the utilitarian school of thought, and by the constantly accumulating evidence for the need of disease prevention, public health reform was pressed with new vigor.

The problems, however, were now approached in a more scientific manner. Conditions were surveyed and fully reported before a course of action was taken. The result of such action was subjected to the test of statistics. In their devotion to blue books and official reports, their passion for departmental efficiency, their faith in the power of central government, and their impatience with newfangled "germs"

and "inoculations," the sanitary reformers developed a dynamic program of action. Chadwick and Florence Nightingale are typical of the sanitary reformers of the period.

Two measures of social reorganization were introduced that had a profound influence on the public health development. These were the reconstitution of local authorities, and the reform of the Poor Law. As far back as the fourteenth century there is discernible a slow upward movement of the lower stratum of society. This movement was hastened in the eighteenth century by the industrial revolution. Ideas of government to provide a freer life were rapidly spread through the mass of the people. Trade-unions, cooperative societies, and similar democratic organizations sprang into existence. The popular struggle against entrenched authority began. The outcome of these efforts was the Reform Bill of 1832. Democratic control of government led to the reform of the Poor Law in 1834. Throughout the remainder of the nineteenth century and down to our times action dealing with public health has developed along lines of *local action* with *central control.* The utilitarian doctrine that "power may be localized but knowledge to be most useful must be centralized" still persisted. Edwin Chadwick in the areas of legislation and administration, Thomas Southwood Smith in the application of popular education as support for legislation, and Florence Nightingale in the realm of improved nursing care are prototypes of the reorganization of the social forces of England in the public health movement.

Establishment of Germ Theory of Disease Causation. In 1857 Louis Pasteur (1822–1895),[1] a French chemist, was at work upon the problem of fermentation. The doctrine that fermentation was a purely chemical disintegration held al-

[1] René Vallery-Radot, "The Life of Pasteur," trans. by R. L. Devonshire Doubleday & Company, Inc., New York, 1923.

Emile Duclaus, "Pasteur, The History of a Mind," trans. by E. F. Smith and Florence Hedges, W. B. Saunders Company, Philadelphia, 1920.

most complete domination in the world of ideas. In two papers on lactic acid and alcoholic fermentation in 1857, Pasteur demonstrated that the process of fermentation was due

FIG. 12. Louis Pasteur (1822–1895). (*From the collection, New York Academy of Medicine.*)

to microorganisms. He proved further that each particular fermentation was caused by a particular kind of microorganism.

In 1859 Pasteur engaged in controversy as to the "origin of life." The discussion especially centered upon what were then regarded as the lowest forms of life, the bacteria. There were two elements involved in the controversy—one the gen-

eration of specific organisms, the other that indefinable quality called life.[2] Pasteur, in 1862, disproved the spontaneous generation or origin of microorganisms. The problem of life remained, and still remains, unsolved. As Singer cryptically sums up the whole matter, Pasteur proved that "no life, no ferment; no ferment, no fermentation." Neither the doctrine of *contagium vivium* nor the allied doctrine of the specificity of infection could find a firm intellectual basis while the doctrine of spontaneous generation was dominant.

The first disease that Pasteur demonstrated as causatively related to living organisms was a condition that was devastating the wine industry of France.[3] This was in 1863. In 1865 he proved the contagiousness of disease in the silk industry, showed that the disease was due to a living organism, and followed the organism through the life history of the moth, egg, worm, and chrysalis.[4] In 1871 Pasteur began his investigations into the disease of beer.[5] This work naturally led to an enlargement of his views on the nature and action of microorganisms.

The first disease on which Pasteur was able to throw light was anthrax.[6] This is a deadly and highly contagious condition which commonly affects cattle but sometimes spreads to man. Pasteur was successful in obtaining pure cultures of anthrax. The question was then being debated in France as to whether anthrax was caused by a "virus" (a nonliving poison), or by a microbe. Pasteur carried his experiments with anthrax to a clarification of chicken cholera in fowls.[7] An old culture of chicken cholera was injected into fowls and failed to kill them. It occurred to Pasteur to inoculate the same chickens with an active culture which, surprisingly,

[2] Iago Galdston, "Progress in Medicine," Alfred A. Knopf, Inc., New York, 1940, p. 24.

[3] Paper on wine presented in 1866.

[4] Paper on silkworm disease presented in 1870.

[5] Paper on beer disease presented in 1876.

[6] Paper on anthrax presented in 1877.

[7] Paper on chicken cholera presented in 1880.

they resisted. They had become immune. Pasteur quickly grasped the principle, threw himself into the new task of deliberately weakening disease organisms to make them immunizing agents, and presently had a vaccine against anthrax. Between 1881 and 1885 Pasteur was engaged in studying hydrophobia[8] following the line of his work in anthrax. In 1885 came his dramatic demonstration of antirabic inoculation in man.

Pasteur's discoveries may be summed up as follows: (1) each fermentation is produced by the development of a special microbe; (2) each infectious disease (so far as the studies of Pasteur and his associates carried them) is produced by the development within the organism of a special microbe; and (3) the microbe of an infectious disease, cultivated under certain detrimental conditions, is attenuated in its pathogenic activity—from a virus it has become a vaccine.

Jenner had vaccinated against smallpox on an empirical basis, but Pasteur's vaccines owed their discovery to the methodical laboratory investigation of known pathogenic organisms.[9]

Galdston has epitomized Pasteur's work in the following words:

> Pasteur's greatness is greater than that of his discoveries. Most of his achievements were anticipated by his predecessors. Spallanzani and not Pasteur is the factual discoverer of pasteurization, and the process of sterilization by heating was utilized for the preservation of food-stuffs in 1831. The theory of the germ causation of disease was well advanced before Pasteur came upon the scene. Bassi had anticipated Pasteur in his work on the silk-worm. Schwann and Cagniard-Latour had associated brewer's yeast with the phenomenon of alcoholic fermentation. Jenner had shown how a modified virus, vaccina, could prove effective in preventing small-pox.[10]

[8] Paper on hydrophobia presented in 1884–1885.

[9] Geddes Smith, "Plague on Us," Commonwealth Fund, Division of Publication, New York, 1941, p. 65.

[10] Galdston, *op. cit.*, p. 31. By permission.

The work begun by Pasteur had its effect upon surgery through Joseph Lister (1827–1912), an English surgeon. The great obstacles of the nineteenth century in surgery were pain and infection. After the year 1846 the introduction of anes-

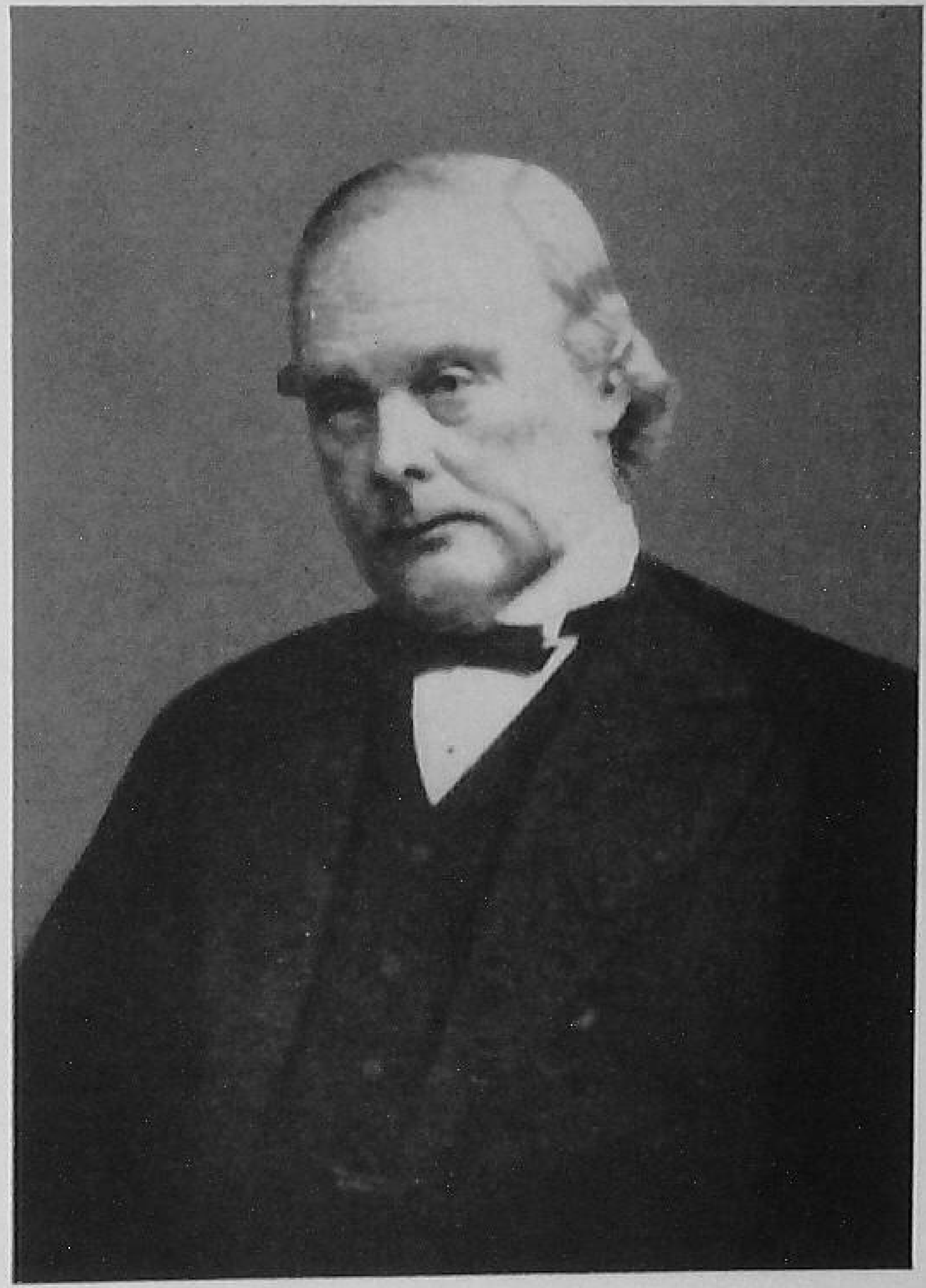

FIG. 13. Joseph Lister (1827–1912). (*From the collection, New York Academy of Medicine.*)

thetics to abolish pain became general. Thus the first great hindrance to successful surgery was removed. This completely revolutionized the possibilities of the application of surgery to diseased processes. But the problem of infection remained—occasionally a wound healed primarily, without the formation of pus, but the majority became "putrid" (to use the phrase then current), or as we now say, "infected."

Pus poured from the wounds, and hospital gangrene, erysipelas, pyemia, and septicemia were stumbling blocks to all surgical processes. Surgery, therefore, was limited in scope. The surgeon treated fractures, flesh wounds, superficial ulcers, and new growths. He lanced abscesses. He operated for bladder stone and hernia, but rarely for ovarian cyst. He was chary of entering the abdominal cavity or the chest. Such surgery was practiced only in desperate cases.[11] This was the situation when Joseph Lister applied the discoveries of Pasteur to surgery.

In 1860 Lister was appointed professor of surgery at the University of Glasgow. It was not long before he became concerned with the septic diseases that afflicted the surgical patient. Belief in the inevitability of "laudable pus" was widespread. Around 1861 Lister began to teach publicly that the occurrence of pus in a wound was determined "simply by the influence of decomposition." The nature of decomposition was revealed to him by the writings of Pasteur. From Pasteur, Lister learned that putrefaction was in fact fermentation and that it was caused by the growth of minute microscopic organisms borne by the air. It was generally thought that air was the cause of sepsis, and precautions were taken to exclude air from wounds. But Lister saw that the troublemaker was not the air but that which it carried.

The problem Lister faced was to exclude the pathogenic microorganisms from wounds during and after operation. His solution of this problem through the use of carbolic-acid spray developed as "anti-septic surgery," which later became "aseptic surgery." As a result the surgeon advanced from the limbs to the trunk, from the abdominal cavity to the thoracic cavity, hence to the cranial cavity, and from there even to the heart. "Thus was the germ theory first brilliantly applied to the control of diseases of human beings,"[12] and the second great hindrance to successful surgery was removed.

[11] *Ibid.*, pp. 96–97.

[12] C.-E. A. Winslow, "The Conquest of Epidemic Disease," Princeton University Press, Princeton, N.J., p. 303.

The name of Robert Koch (1843–1910), a German physician, is inseparably connected with those of Pasteur and Lister. These three men form a trio that opened a new vista in

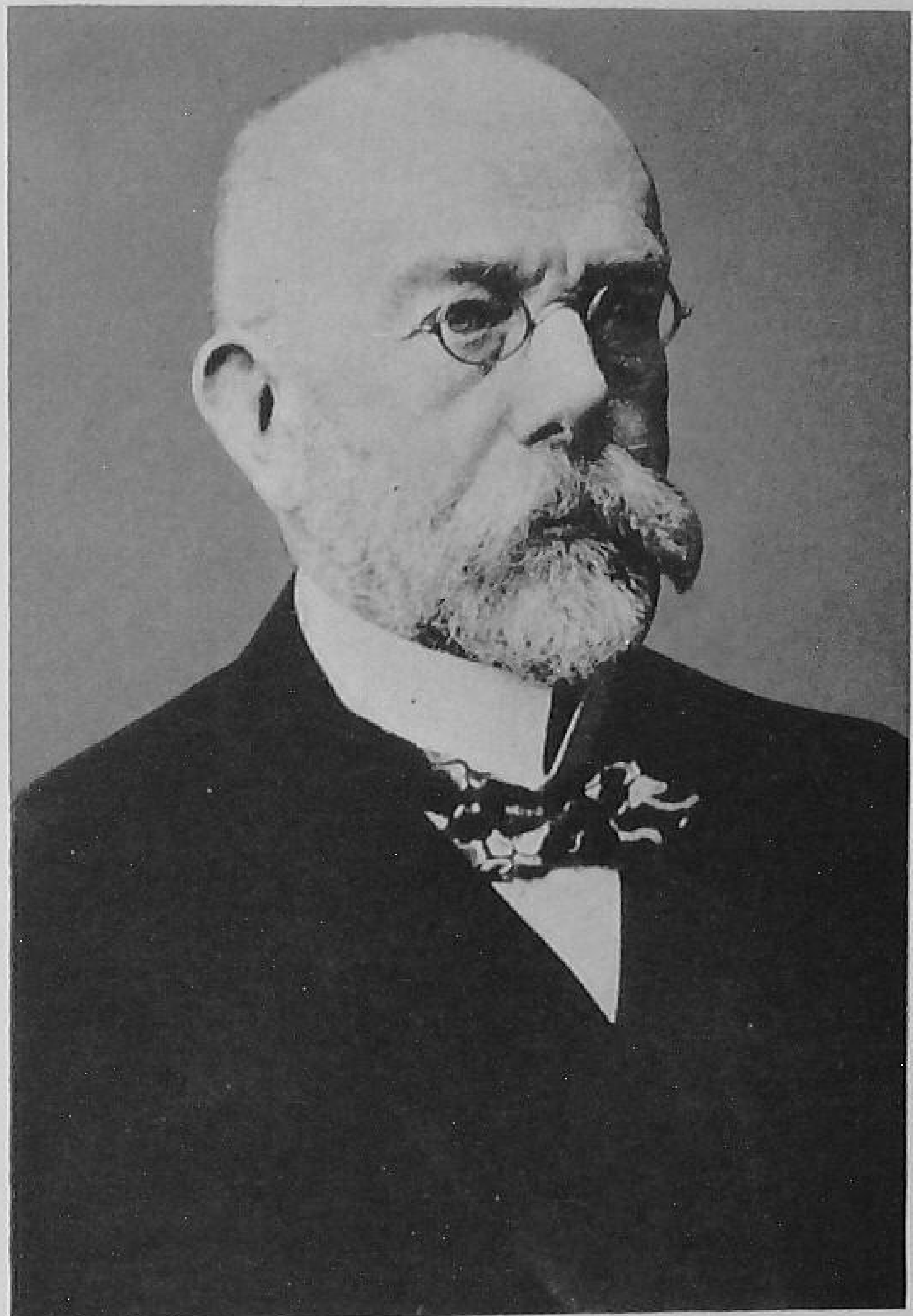

FIG. 14. Robert Koch (1843–1910). *(From the collection, National Tuberculosis Association.)*

the control of communicable diseases. Koch, in 1876, showed that the anthrax bacilli, under certain conditions, formed "spores" (small encysted bodies resistant to heat and other changes of external conditions). He found that spores always form in the blood and tissues of animals dead from anthrax provided that (1) the temperature is suitable, and (2) there is sufficient oxygen. Pasteur did not know of Koch's work on

anthrax at the time he was making his own studies of the disease.

While it is to Pasteur that we owe the foundations of knowledge of the nature of infection, it is to Koch that we owe the main basis of the technique (bacteriology) by which diseases are now studied. Koch was a pupil of Jakob Henle, who had set forth the criteria which must be satisfied in order to prove that a given organism causes a given disease. But Koch went a step farther than Henle, and the principles that he established (now known as "Koch's Postulates") did much to standardize investigation in the decades that followed.

Briefly these postulates are: (1) that the parasite must be found in every case of the disease and under conditions which explain the pathology and clinical behavior of the disease; (2) the parasite must not be found as an accidental harmless invader in other diseases; (3) the parasite, when obtained in pure culture, must reproduce the disease in susceptible animals; and (4) the parasite must be recovered from such animals in pure culture, and this culture likewise must reproduce the disease.

Koch made many technical advances in the study of bacteria which helped to establish the new science of bacteriology. In 1878 he began his investigations into the etiology of traumatic infective diseases, and on March 24, 1882, he made the announcement of his discovery of the *tubercle bacillus* as the causative organism in tuberculosis. In his paper on "Aetiology of Tuberculosis"[13] Koch set forth a classic account of the steps he took in the discovery of the tubercle bacillus. It presented "the first instance in which final proof was afforded in terms of the 'postulates' of a bacterial cause of human disease."[14] Koch, in 1883, also discovered the cholera vibrio and, by isolating the organism from drinking water and food, showed how effective control of cholera could be established.

[13] Translated by Max and Berna R. Pinner, prepared for *American Review of Tuberculosis*, March, 1932.

[14] Richard H. Shryock, "Development of Modern Medicine," Alfred A. Knopf, Inc., New York, 1947, p. 286.

He urged the filtration of water supplies to prevent water-borne epidemics of this and other diseases. Long writes:

Koch's service in the understanding of the bacteriology of disease was three-fold. He developed methods for discovering bacteria and isolating them in pure culture free from all other forms; he defined the conditions for recognizing a particular germ as the cause of a particular disease; and finally, he made a series of brilliant discoveries of specific disease-producing bacteria himself.[15]

Singer says of him:

Koch was unquestionably the greatest bacteriologist that the world has seen. His genius was limited as compared with that of Pasteur, but his exquisite technical skill and acumen have never been excelled.

Since the time of Pasteur and Koch, the study of infectious disease has developed along various special lines. The work of these two men, however, had determined the direction of those lines, and they themselves are the most typical, as well as the greatest representatives of the most important of all movements in Modern Medicine.[16]

A long list of discoveries of pathogenic microorganisms were now made in rapid succession.[17] Bacteriologists were on the track of the causative factor of many of the major communicable diseases of man.

As Shryock[18] has pointed out, it is necessary to bear in mind in our estimate of modern scientific medicine that the "planters" are equally as important as the "harvesters." The

[15] E. R. Long, "A History of Pathology," The Williams & Wilkins Company, Baltimore, 1928, p. 241. By permission.

[16] Charles Singer, "A Short History of Medicine," Oxford University Press, New York, 1928, pp. 234–235.

[17] See F. P. Gorham, "The History of Bacteriology and Its Contribution to Public Health Work," in M. P. Ravenel, ed., "A Half Century of Public Health," pp. 71–72, for an excellent account of these discoveries.

[18] Richard H. Shryock, "The Rise of Modern Scientific Medicine," in "Studies of the History of Science," University of Pennsylvania Press, Philadelphia, 1941, pp. 55–64.

works of Morgagni in Padua, of Bichat in Paris, and of Virchow in Germany were the necessary antecedents to the work of Pasteur in France and of Koch in Germany.

In the next chapter the relationship between the germ theory of disease causation and the public health movement will be presented.

Suggested Reading

Ravenel, M. P., ed., "A Half Century of Public Health," American Public Health Association, New York, 1921.

Tobey, James A., "Riders of the Plagues—The Story of the Conquest of Disease," Charles Scribner's Sons, New York, 1930.

Galdston, Iago, "Progress in Medicine, A Critical Review of the Last Hundred Years," Alfred A. Knopf, Inc., New York, 1940.

Woodward, E. L., "The Age of Reform, 1815–1870," Oxford University Press, New York, 1946.

CHAPTER 8

RELATIONSHIP OF GERM THEORY TO PUBLIC HEALTH WORK

At the beginning of the work by Pasteur, Lister, and Koch the ideas that dominated public health practices were founded upon a *filth theory* of epidemic disease causation. It was believed that epidemic disease bred in filth instead of merely being carried by filth. As a correlative, it was believed that *all* dirt was dangerous, not merely the secretions and excretions of the human body. Finally, it was believed that the epidemic diseases were usually air-borne.

Up to this time there had been developed four methods of control of epidemic diseases—isolation, quarantine, the destruction of goods, and vaccination against smallpox. The emphasis upon the filth theory of epidemic diseases demanded a shift from quarantine to sanitary reform. There was also a shift in emphasis from the personal to the public aspect of the problem.

The germ theory gave rise to the belief that diseases were caused by germs that pass from person to person. This theory caused attention to be shifted from the environment to man himself as the great source of danger in the spread of disease. Contagion was no longer feared as some intangible, unknown effluvium permeating the atmosphere against which man has no protection.

However, the germ theory posed many problems. To the word *contagion* now was added the word *infection* to mark the distinction between those diseases of which the cause was unknown, and those diseases in which the cause was known. A major problem was to explain the processes by which in-

fection was spread among men. In addition to the air, water, milk, and food as sources for the carrying of infectious microorganisms, a new field was laid bare in the work done by the medical entomologists.

Medical Entomology. Shryock indicates that "no one would question that medical entomologists share with medical bacteriologists the credit for the unprecedented achievements of modern preventive medicine."[1]

The first disease-producing organisms observed were those associated with skin infections. In 1786 Johann Ernst Wichmann (1740–1802) of Hanover, Germany, demonstrated that the seven-year itch (scabies) was caused by a parasite—the scabies mite. Between 1839 and 1846 four distinct skin infections were found to be attributable to microorganisms. These were scabies, favus, tinea sycosis, and Microsporon furfur; and they were found to belong to the fungus variety of microorganisms.

In 1879 Sir Patrick Manson (1844–1922) of Aberdeen, Scotland, had shown that the mosquito was the carrier of the worms of the tropical disease *filariasis*. In 1880 Alphonse Laveran (1845–1922) of Paris was the first to see the malarial parasite in the red blood corpuscles. In 1898 Ronald Ross (1857–1932) of the Indian Army Medical Service proved experimentally that the malaria of birds was transmitted by the anopheles mosquito. This was the first great discovery in medical entomology.

In 1889 Theobald Smith (1859–1934) of Albany, N.Y., demonstrated that "Texas fever" was caused by a parasite and that it was spread among cattle by the bite of an infected tick. This ranks as the second great discovery in medical entomology.

The third great discovery in this field was the proof of the Stegomyia fasciatus mosquito as the carrier of yellow fever, made in 1900 by the Yellow Fever Commission of the United

[1] Richard H. Shryock, "Development of Modern Medicine," Alfred A. Knopf, Inc., New York, 1947, p. 290.

States Army, led by Doctors Walter Reed, Jesse W. Lazear, and James Carroll.

In 1894, Shibasaburo Kitasato (1852–1931) of Tokyo, Japan, and Alexandre Yersin (1863–1943) of France independently established the identity of bubonic plague with one that occurs in rats. In 1898 Simond successfully carried out experiments in the transmission of plague by rat fleas. In 1910 Ricketts and Wilder established the fact that typhus fever is communicated by the body louse.[2]

And so was added to our knowledge of the spread of infectious diseases a new list of agents—the flea, the louse, the bedbug, the house fly, the mosquito, and the tick. The word *transmissible* was added to *contagious* and *infectious* to cover the new knowledge acquired through the work of the medical entomologists. Today the word *communicable* is used to convey the ideas and theories embracing our present knowledge concerning the spread of endemic, epidemic, and pandemic diseases.[3]

Parasitology. It was soon discovered that the pathogenic microorganisms were not all of the same kind. Most of them belong to the vegetable kingdom and are classed as *bacteria*, the scientific study of which is *bacteriology*. Some belong to the animal kingdom and are classed as *protozoa*, the scientific study of which is *protozoology*. Others are classed as *viruses*, about which knowledge is not sufficient as yet to form a separate science. And finally there are the *Rickettsiae*, which look like bacteria but, unlike bacteria, thrive only within the cells of the host. These Rickettsiae seem to stand between the bacteria and the viruses in the classification of pathogenic microorganisms. The study of these various forms of life is embraced in the science of *parasitology*.

[2] See Hans Zinsser, "Rats, Lice, and History," Little, Brown & Company, Boston, 1935.

[3] These are all words derived from the Latin and reference to their roots serves to illuminate their usage at particular periods of development in our ideas and theories concerning this subject.

Immunology. The concept of immunity is old. The fact that certain species of animals and men, and certain individuals among these, are more resistant to disease than others, and that the same individuals are more resistant at one time than at another, is the result of experience and observation from the earliest times.[4] The ancients likewise recognized that one seizure with a certain disease afforded protection against subsequent attacks. The Chinese held this belief centuries ago and practiced inoculation against smallpox by producing a mild case of the disease as a means of immunizing against later natural contagion. Thus immunity, both *natural* and *acquired*, has long been known. The explanation of immunity and the methods of producing or controlling it are the outgrowth of the germ theory.

Another problem posed by the germ theory was a phenomenon first observed in smallpox. The production of protection against the disease by inoculation was practiced in many parts of the world. In 1713 information about the method was received in England, and in 1721 Lady Mary Wortley Montagu had her own son inoculated at Constantinople. The practice spread in England until it was observed that the process was not without its dangers.

In 1798 Edward Jenner established the best foundation of immunology when he published his observations on the use of vaccination with cowpox as a means of preventing smallpox. Jenner showed that cowpox was inoculable upon man and could be transferred from man to man. He proved that vaccinia in man protected against smallpox and made vaccination practicable.

Pasteur's discovery of the attenuation of viruses in chicken cholera was the second great advance which led to the prevention of infective diseases by artificial inoculation.

In 1884 Salmon and Theobald Smith showed that *dead* virus can induce immunity against *living* virus.

Out of this knowledge two schools of thought developed.

[4] Esmond R. Long, "A History of Pathology," The Williams & Wilkins Company, Baltimore, 1928, p. 233.

One held that the immunity was due to *antibodies* in the blood stream and fluids of the tissues. The other held that *phagocytosis* (a cellular process) destroyed the viruses. These issues were resolved when Denys and Leclef demonstrated that both elements were involved.

Out of all this theory and experimentation there grew a recognition that it was not only the attack of the germ but also the lack of resistance in man which was the cause of disease. An infection was a reaction between the pathogenic organisms and the body cells.

The direction taken by present-day investigation relates to a renewed interest in biological studies in heredity encompassed under the term "eugenics," the molecular constitution of the cells and their mechanisms, which control bodily processes, the relation of the ductless glands to disease and health as revealed by endocrinology, the increased understanding of the physiology of nutrition in the production of disease and the maintenance of health, and, finally, a sound personal hygiene as the basis for the maintenance and promotion of man's general condition.[5]

All these developments have had a revolutionary effect upon the public health movement.

> Their application to practice was on three levels: (1) prevention, (2) artificial immunization to protect those who could not avoid exposure, and (3) cure for those who become ill in spite of the other precautions. . . . Their value to mankind ranks in the order stated: prevention surpasses immunization, and immunization is superior to cure.[6]

The work of Darwin and Pasteur, both beginning in 1859, revolutionized the concepts of man's place in the universe. The establishment of the germ theory of disease made possible new methods of attack. Prevention and immunization

[5] Shryock, *op. cit.*, pp. 304–314.

[6] Richard H. Shryock, "American Medical Research, Past and Present," Commonwealth Fund, Division of Publication, New York, 1947, p. 197. By permission.

now reinforce isolation, quarantine, and destruction of goods, with a consequent reduction in mortality and morbidity. This in turn has brought about a dramatic change in the age composition of the population and in longevity. Attention now shifts to chronic diseases of the older-age periods.

While it may seem a long journey from the days of primitive man's ideas of disease as attributable to demons and the slow evolution of ideas relating to explanations of disease as a natural phenomenon, yet a clear understanding of the road traveled must be the foundation of any community health education program. Our present public health practices find their roots in this evolutionary process. This will become clear as we examine the modern public health program in Part II of this volume.

Suggested Reading

Long, Esmond R., "A History of Pathology," The Williams & Wilkins Company, Baltimore, 1928.

Zinsser, Hans, "Rats, Lice, and History," Little, Brown & Company, Boston, 1935.

Bulloch, W., "The History of Bacteriology," Oxford University Press, New York, 1938.

Moulton, Forest Ray, and Justus J. Schifferes, "The Autobiography of Science," Doubleday and Company, Inc., New York, 1945.

Cohn, Edwin J., "Research in the Medical Sciences," in "Medicine Today," Columbia University Press, New York, 1947, pp. 70–121.

Shryock, Richard H., "American Medical Research, Past and Present," Commonwealth Fund, Division of Publication, New York, 1947.

PART II

Modern Public Health

CHAPTER 9

MODERN DEVELOPMENT OF PUBLIC HEALTH WORK

Thus far it becomes clear that five factors underlie the problems of health:

1. An increase in scientific knowledge.
2. The multiplication of mechanical aids to increased sight, sound, and measurement.
3. An ever-widening application of economic, political, and social participation of the people in community life through education.
4. The constant diffusion throughout the entire population of a rising standard of living.
5. A steady improvement in the organization and administration of knowledge prevailing at a given time for the restoration, conservation, and promotion of the health of each individual in every community.

Attention has been given to the basic contributions made to the development of the public health movement since the sixteenth century. These contributions represent an outgrowth of the humanitarian spirit and the progress of the natural and social sciences. The experiences and influences in English developments have been stressed, for it is from these sources that the modern health movement in this country has been derived. In England the health program of prevention, based upon popular education with lay and professional support, was the foundation of the approach to the solution of the problem.

In contrast, the development of public health in Continental Europe was essentially a part of "police power" or "state medicine." The idea of prevention of disease by minute reg-

ulations of the individual by the state was first propounded by Johann Peter Frank (1745–1821) of Bavaria who published "Complete System of Medical Polity"[1] in four volumes between 1777 and 1788. This great work covered the whole

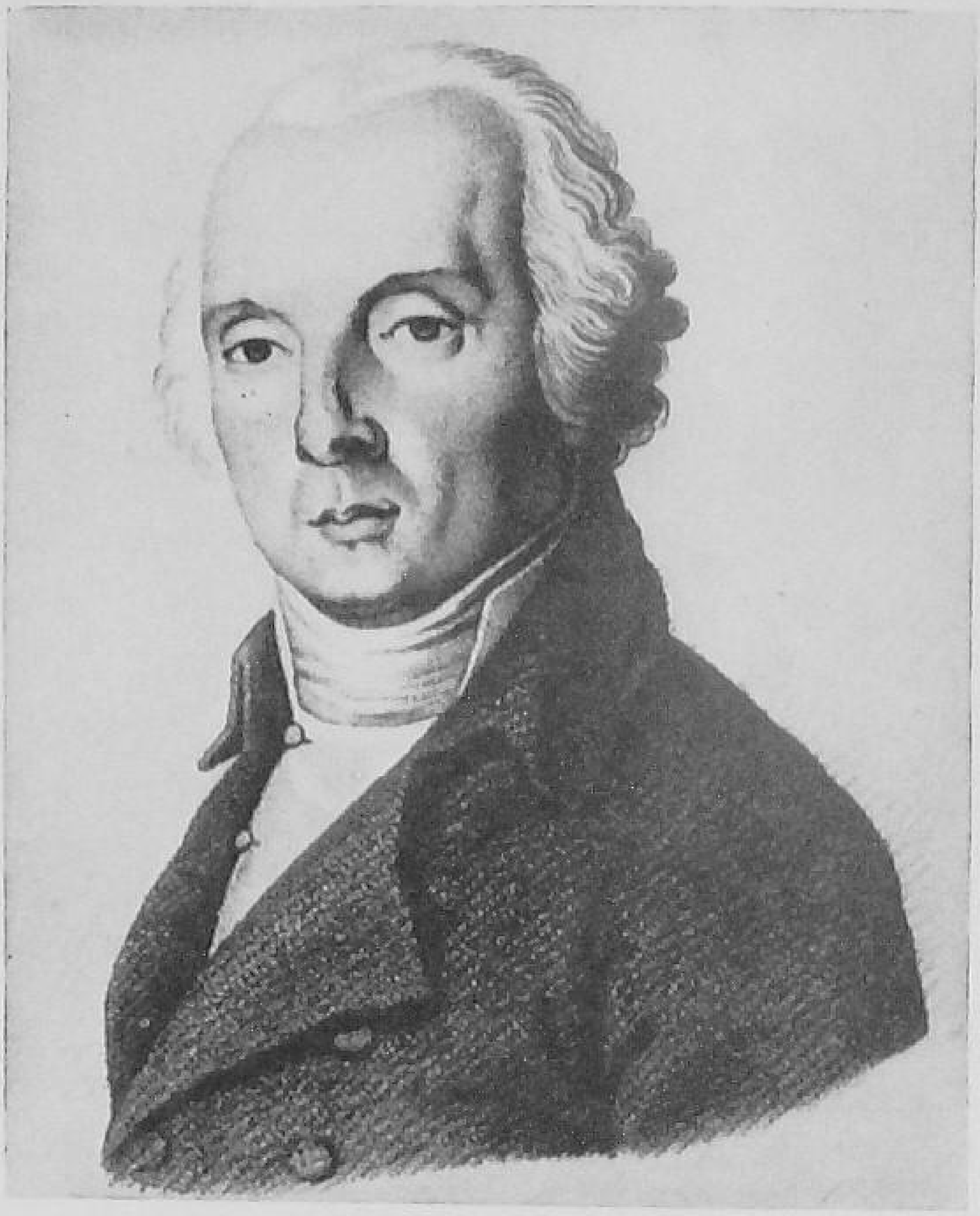

Fig. 15. Johann Peter Frank (1745–1821). *(From the collection, New York Academy of Medicine.)*

subject of man's life "from the womb to the tomb." It included sewerage, water supply, school hygiene, and sex hygiene, as well as the ideal of scientific "medical police."[2]

[1] An exception to this in England is found in John Roberton, who published his "Medical Police" in Edinburgh in 1808. He followed the lines developed in the German approach to the problem. The broad filiation of ideas in this field is signified by the terms "medical police," "public health," and "social medicine."

[2] M. E. M. Walker, "Pioneers of Public Health," The Macmillan Company, New York, 1930, pp. 35–47.

A follower of Frank was Max von Pettenkofer (1818–1901), another native of Bavaria. He was the founder of experimental hygiene and became the director of the first Hygienic Institute at Munich in 1879. After 1855 he devoted

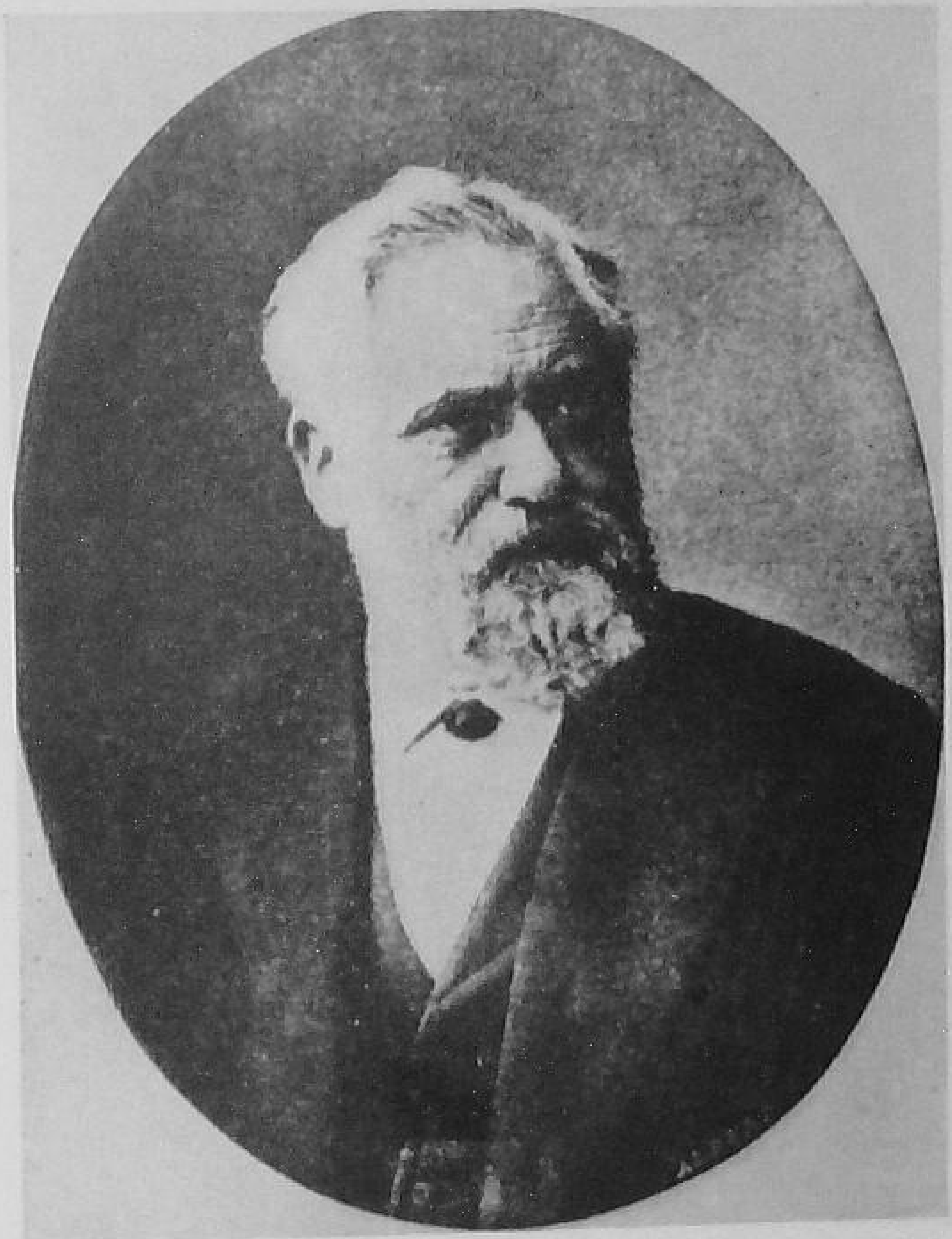

FIG. 16. Max von Pettenkofer (1818–1901). *(From the collection, New York Academy of Medicine.)*

attention to the etiology of cholera and typhoid fever, the spread of which he attributed to soil and soil water. His "Investigations and Observations on the Method of Spread of Cholera"[3] was published in 1855.

In England the forces at work changed the public health movement from an individual character to a community effort. The process of change was speeded by Jeremy Bentham

[3] *Ibid.*, pp. 115–125.

(1748–1832). Singer calls Bentham the spiritual father of public health legislation. As the founder of the utilitarian philosophy, "Bentham made a sustained attempt to draw a

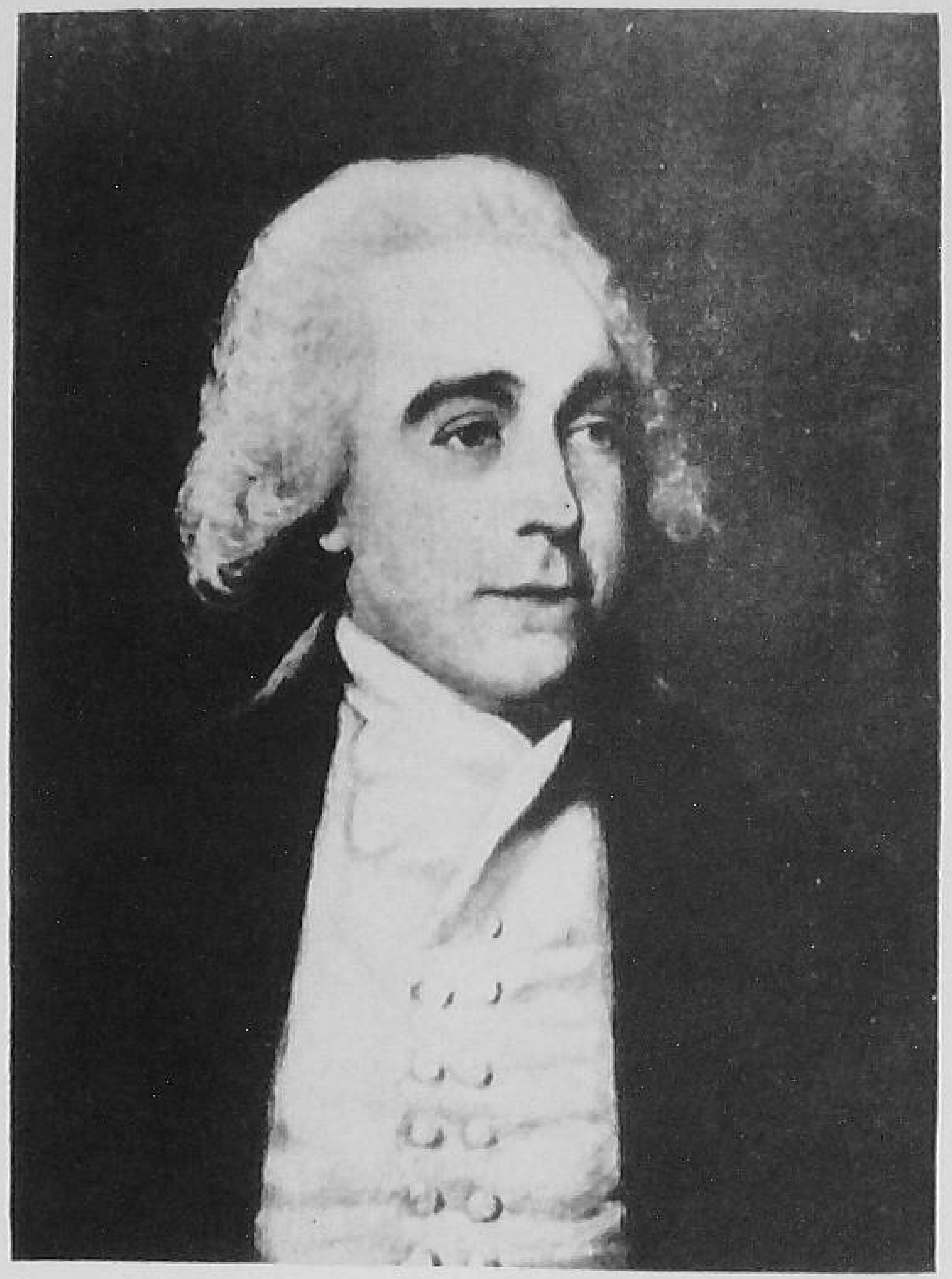

Fig. 17. Jeremy Bentham (1748–1832). (*From the collection, New York Academy of Medicine.*)

parallel between the physical and the social sciences, and this gave him a special influence over medical thinkers and especially over those that dealt with the public health."[4] In 1829 Chadwick went to live with Bentham to assist him in working on "The Administrative Code" and remained there until Bentham's death in 1832. It was from Bentham that Chad-

[4] Charles Singer, "A Short History of Medicine," Oxford University Press, New York, 1928, pp. 190–191. By permission.

wick derived many of the ideas which he later put into legislative and administrative practice. As early as 1820 Bentham had suggested that in a hypothetical cabinet of fourteen there should be ministers for education and for health, including the administration of medical treatment and preventive services.[5]

The first attempt in this country to gather data relating to the development of public health was made by Henry I. Bowditch of Massachusetts in his address on "Public Hygiene in America"[6] at the International Medical Congress in Philadelphia in 1876. Dr. Bowditch treated the subject under the title of "State Preventive Medicine" and divided his thesis into three epochs: first epoch, or that of medical-system making, 1776 to 1832; second epoch, or that of observation, 1832 to 1869; and third epoch, or that in which the medical profession is aided by the laity and state preventive medicine is inaugurated, 1869 to the far-off future.

In 1900 Dr. Peter H. Bryce of Toronto, Canada, suggested[7] four periods in the evolution of public health, as follows: (1) the period of investigation, extending to about 1830; (2) the period of agitation, extending to 1850; (3) the period of legislation, to 1875; and (4) the period of elaboration and development, to 1900.

Chapin[8] in 1921 proposed several divisions in the evolution

[5] Jeremy Bentham, "Constitution Code," in John Bowring (ed.), "Collected Works of Jeremy Bentham," Vol. IX, Edinburgh, 1838–1843.

[6] Henry I. Bowditch, "Public Hygiene in America: Being the Centennial Discourse," delivered before the International Medical Congress, Philadelphia, September, 1876, with Extracts from Correspondence from the Various States, Together with a Digest of American Sanitary Law by Henry G. Pickering, Esq., Little, Brown & Company, Boston, 1877.

[7] Peter H. Bryce, "A Survey of Public Sanitation in the Nineteenth Century," President's Address, Reports and Papers of the American Public Health Association, Vol. 26, 1900, pp. 1–27.

[8] C. V. Chapin, "The History of Preventive Medicine," *Journal of the American Medical Association*, Vol. 76, No. 4, January, 1921, pp. 215–222.

of preventive medicine, as follows: first period—filth theory, environment, 1848–1878; second period—contagious theory, isolation of the sick, 1879–1890; and third period—community hygiene, personal instruction, 1890–1921.

Winslow[9] divided the development of modern public health into three broad segments, as follows: (1) the period of empirical environmental sanitation, 1840–1890; (2) the period of scientific control of communicable disease by the applications of bacteriology, 1890–1910; and (3) the period of hygienic instruction, plus the organization of medical service for the detection and early treatment of incipient disease, 1900–1923.

Smillie[10] gives the following divisions for the public health movement in the United States: (1) the pioneer period, colonial times to 1800; (2) the dark ages, 1800–1850; (3) the awakening, 1850–1875; (4) the golden era of communicable-disease control, 1875–1900; (5) community action in the protection of the health of the individual, 1900–1925; and (6) the nationalization of public health, 1925–1946.

The writer's divisions of the modern public health movement are as follows: (1) era of sanitation, 1838–1876; (2) era of infectious-disease control, 1877–1903; (3) era of hygiene, 1904–1919; (4) era of social medicine, 1920–1934; and (5) era of social insurance, 1935–1948.

It is obvious that any attempt to outline the various divisions in public health development must be arbitrary. As a matter of fact, the processes employed in each of the divisions overlap and flow into one another, and many of the early practices are in use today. One needs only to examine the history of such practices as isolation, quarantine, the destruction or fumigation of materials (fomites), the flying of white notification flags (placarding), sanitation, notification, regis-

[9] C-E. A. Winslow, "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923.

[10] Wilson G. Smillie, "Preventive Medicine and Public Health," The Macmillan Company, New York, 1946, pp. 7–9.

tration, bacteriology, public health nursing, health education, and social insurance, to realize the degree of overlapping.

In the following discussions it should be borne in mind that the classifications employed are only for convenience and clarification.

Suggested Reading

Welch, William Henry, "Public Health in Theory and Practice: An Historical Review," Yale University Press, New Haven, 1925.

Shryock, Richard H., "The Origins and Significance of the Public Health Movement in the United States," *Annals of Medical History*, n.s., Vol. 1, No. 6, November, 1929, pp. 645–665.

———, "The Early American Public Health Movement," *American Journal of Public Health*, Vol. 27, No. 10, October, 1937, pp. 965–971.

Walker, M. E. M., "Pioneers of Public Health," The Macmillan Company, New York, 1930.

Winslow, C.-E. A., "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923.

Smillie, Wilson G., "Preventive Medicine and Public Health," The Macmillan Company, New York, 1946.

Kramer, Howard D., "The Beginnings of the Public Health Movement in the United States," *Bulletin of the History of Medicine*, Vol. XXI, No. 3, May–June, 1947, pp. 352–376.

CHAPTER 10

ERA OF SANITATION, 1838–1876

As has been indicated, the intimate relationship between disease and poverty had been slowly dawning upon investigators during the eighteenth century. John Howard especially had pointed out in his studies of gaol fever, the close connection between overcrowding, lack of ventilation, and filth. Thomas Percival and John Ferrier of Manchester, England, in 1796 had revealed the burden of disease among factory operatives caused by fatigue, undernourishment, and overcrowding.[1]

England. The era of sanitation had its real beginning in England as a result of two primary factors—the fear engendered by the invasion of Asiatic cholera in 1831, and the Reform Bill of 1832.

"A general concern about disease reappeared," says Shryock, "only when humanitarianism was suddenly supplemented by the old appeal to fear. The terrifying specter of Asiatic Cholera, advancing slowly but relentlessly upon an unprotected Europe, revived the demand for social control as no disinterested humanitarianism could ever have hoped to do."[2]

In June, 1831, a royal proclamation was issued in London warning the country against the approach of cholera, and a temporary national board of health was appointed with powers of advice and investigation. This marked a step forward in health administration, since it was the first time the British government created such a body. The national board or-

[1] John Ferrier, "Medical Histories and Reflections," W. Eyres, Warrington, England, 1792.

[2] Richard H. Shryock, "The Development of Modern Medicine," Alfred A. Knopf, Inc., New York, 1947, p. 108. By permission.

dered town authorities to appoint local boards, which were to investigate, to keep records, and to advise government officials.[3]

When the cholera broke out in England in July, 1831, it attacked chiefly the poor and destitute classes. "The connection between bad living conditions and cholera was too obvious and too dramatic to overlook. . . . The need for sanitary reform emphasized the need for social reforms in general."[4] This led to the Reform Bill of 1832, which had as one of its objectives that the government should take over responsibility for the betterment of social conditions. While the Reform Bill itself contained no health clauses, it did produce three measures which had a profound influence upon the health of the people. First came the Factory Act of 1833, which fixed the working hours of children and young persons and *established factory inspectors under the supervision of the central government.*[5] Second, there was the Poor Law Amendment Act of 1834, which put an end to the systematic abuse of poor law relief and set up the Poor Law Commission—the first central board concerned indirectly with public health. Third was the Municipal Corporation Act in 1835, which readjusted the administrative areas of the boroughs and strengthened local government authority.

In 1832 the government appointed a Poor Law Commission to inquire into the existing poor law system of England. Edwin Chadwick (1800–1890), a lawyer and statistician,[6] was appointed one of the assistant commissioners, and in 1833 he was made chief commissioner. In the report of the Com-

[3] "Official Reports made to the Government by Drs. (William) Russell and (D.) Barry on the Disease called Cholera Spasmodica, as observed by them during their Mission to Russia in 1831," Winchester and Varnham, London, 1832.

[4] Shryock, *op. cit.*, p. 221.

[5] This is the first instance in England in which the central government began its general supervision of local authorities. The problem has been with us from that day to this and is still in a state of flux.

[6] Maurice Marston, "Sir Edwin Chadwick," Small Maynard & Co., Boston, 1925.

mission in 1834, Chadwick proposed the appointment of responsible paid officers under a central board and the formation of larger administrative units to replace 16,500 local units. As a result the Poor Law Amendment Act of 1834 was passed in August, 1834, and Chadwick was appointed secretary of the new Poor Law Board.

Fig. 18. Edwin Chadwick (1800–1890). *(From the collection, New York Academy of Medicine.)*

At the same time there had been agitation to procure the registration of births, marriages, and deaths by the state and not solely by the established church, as was the custom. Chadwick secured a clause in a proposed bill to provide for certifying, not only deaths *but also the cause of death*. Local registrars were elected by the boards of guardians, and the qualified medical attendant of the deceased was made responsible for recording the cause of death. The Births and Deaths Registration Act became law in 1836, effective January, 1837, and with it the General Registrar's Office came into existence. Dr. William Farr (1807–1883) was appointed compiler of abstracts in 1839 and began the national organization of the registration of sickness and death which has proved one of the foundations of English public health administration.[7]

[7] William Farr, "Vital Statistics," Edward Stanford, London, 1885. Biographical sketch by Noel A. Humphreys (ed.), pp. vii–xxiii.

This was the situation when in 1838 the authorities in Whitechapel appealed to the secretary of the Poor Law Board for assistance in contending with an epidemic which was raging in the East End of London. Chadwick persuaded the Poor Law Board to appoint a *medical inquiry*, and thus the first sanitary commission came into being. It was composed

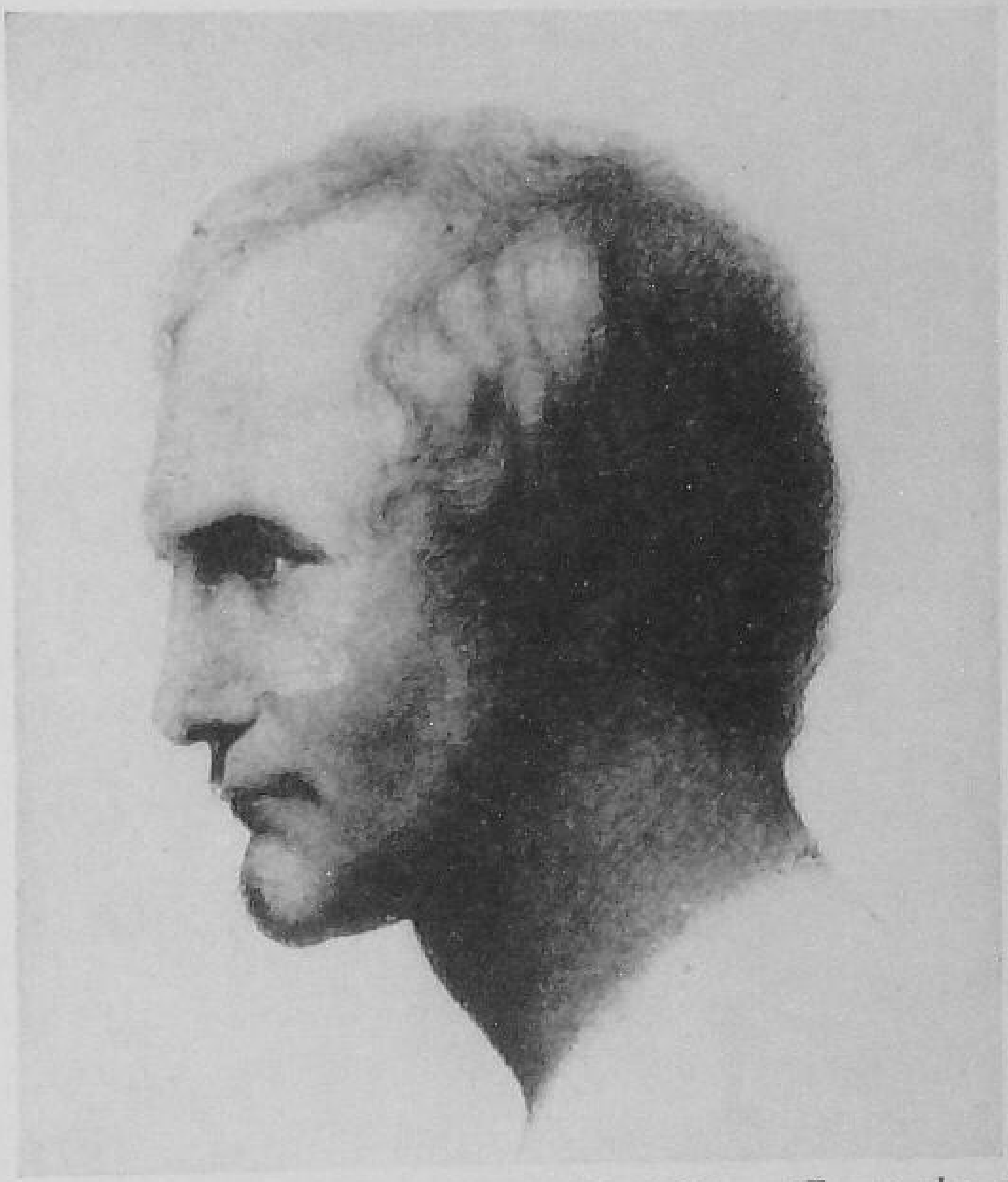

FIG. 19. Thomas Southwood Smith (1788–1861). (*From the collection, New York Academy of Medicine.*)

of Dr. Neil Arnott, Dr. James Kay (afterward Sir James Kay-Shuttleworth), and Dr. Thomas Southwood Smith. Here we have for the first time in English history the direct employment of medical men to advise the government in the face of an epidemic.[8]

The report of this commission in 1838, especially the independent supplement added by Dr. Southwood Smith (1788–

[8] See Chap. 6, pp. 71–72. Dr. Richard Mead was asked but not *employed* to advise the government.

1861),[9] made a deep impression upon public opinion. Smith's description of the problem of water supply and drainage in the district was a vivid indictment of the disgraceful conditions. The report pointed out the great burden thrown on the poor rates (taxes) by sickness and epidemics and urged that it would cost less in the long run to reform the conditions than to continue relieving the poverty they caused. He also urged that action be brought against persons responsible for particular nuisances.

In August, 1839, the Poor Law Commissioners received instructions to report on the sanitary conditions of the laboring classes in England. Edwin Chadwick as secretary of the Poor Law Board was occupied in the investigation until the summer of 1842, when he issued his now famous "Report on an Inquiry into the Sanitary Conditions of the Labouring Population of Great Britain." This book is the basic classic in English public health literature. Chadwick dealt with the social and sanitary conditions found, with the comparative chances of life in different classes of the community, with the financial burdens created by the neglect of sanitary measures, with the evidences of the value of prevention, and with the legislative enactments necessary to improve the environment. His monumental report proved that there was much infectious disease, gross insanitary conditions, defective water supply, an excess of widows and orphans, shortened lives, and high child mortality. All of these conditions were directly traceable to the slums.

In 1842 Lord Normanby introduced a bill in Parliament for the promotion of public health. The bill was defeated, and in 1843 he made a second attempt to secure legislation. Again he was defeated.

The influence of Chadwick's report was widespread and led in 1843 to the appointment of a special royal commission "to inquire into the health of large towns and populous districts." This commission issued two reports, in 1844 and 1845, and

[9] C. L. Lewes, "Dr. Southwood Smith," William Blackwood & Sons, Ltd., Edinburgh, 1898.

these were responsible for initiating the movement for water supply and sewage disposal throughout the world.

In 1844 there was organized in London by Dr. Thomas Southwood Smith[10] a voluntary association of medical and lay workers interested in advancing sanitary reforms. It was called the "Health of Towns Association."[11] Its objective was to give wide circulation to the facts that had been amassed concerning the insanitary conditions and their effects upon the health and life of the English people. This association is the first of a long series of subsequent efforts down to the present to use community health education as a means of creating a favorable public opinion to secure the requisite corrective legislation and to establish effective public health administration.

Agitation by this association served to crystallize the thinking in England, and this, together with another threat of cholera, led to the passage of Lord Morpeth's bill for the promotion of public health in 1848. This act became known as "The Public Health Act of 1848."[12] It created the first official National Board of Health in English history.[13]

[10] Both Smith and Chadwick were disciples of Jeremy Bentham (1748–1832). Singer says, "The chief agent in the awakening process (Public Health), the intellectual force at its back, was and is Jeremy Bentham. Specifically, he is the direct begetter of our Modern System of Organization of the Science of Preventive Medicine" —"A Short History of Medicine," p. 192.

[11] For a detailed account see Robert G. Paterson, "The Health of Towns Association in Great Britain 1844–1849," *Bulletin of the History of Medicine,* Vol. 22, No. 4, July–August, 1948, pp. 373–402.

[12] 11th and 12th Victoria, c. 63, August 31, 1848.

[13] Subsequent legislative changes transferred the work of the General Board of Health to the Privy Council and Home Office in 1858; and in 1871 the Medical Department of the Privy Council and Home Office became a part of the Local Government Board (the medical functions of which were absorbed by the Ministry of Health in 1919); the Public Health Act, 1875; the Ministry of Health, which was formed by the amalgamation of the Local Government Board and the Insurance Commissioners (created in 1911); the Local Government Act, 1929; the Public Health Act, 1936; and the National Health

In addition to this new form of health organization there began the steps to improve the administration of the health laws. In 1847 the City of Liverpool appointed William Henry Duncan (1805–1863) as its full-time health officer. This was the first such appointment in English public health administration.[14] In 1848 John Simon (1816–1904) was ap-

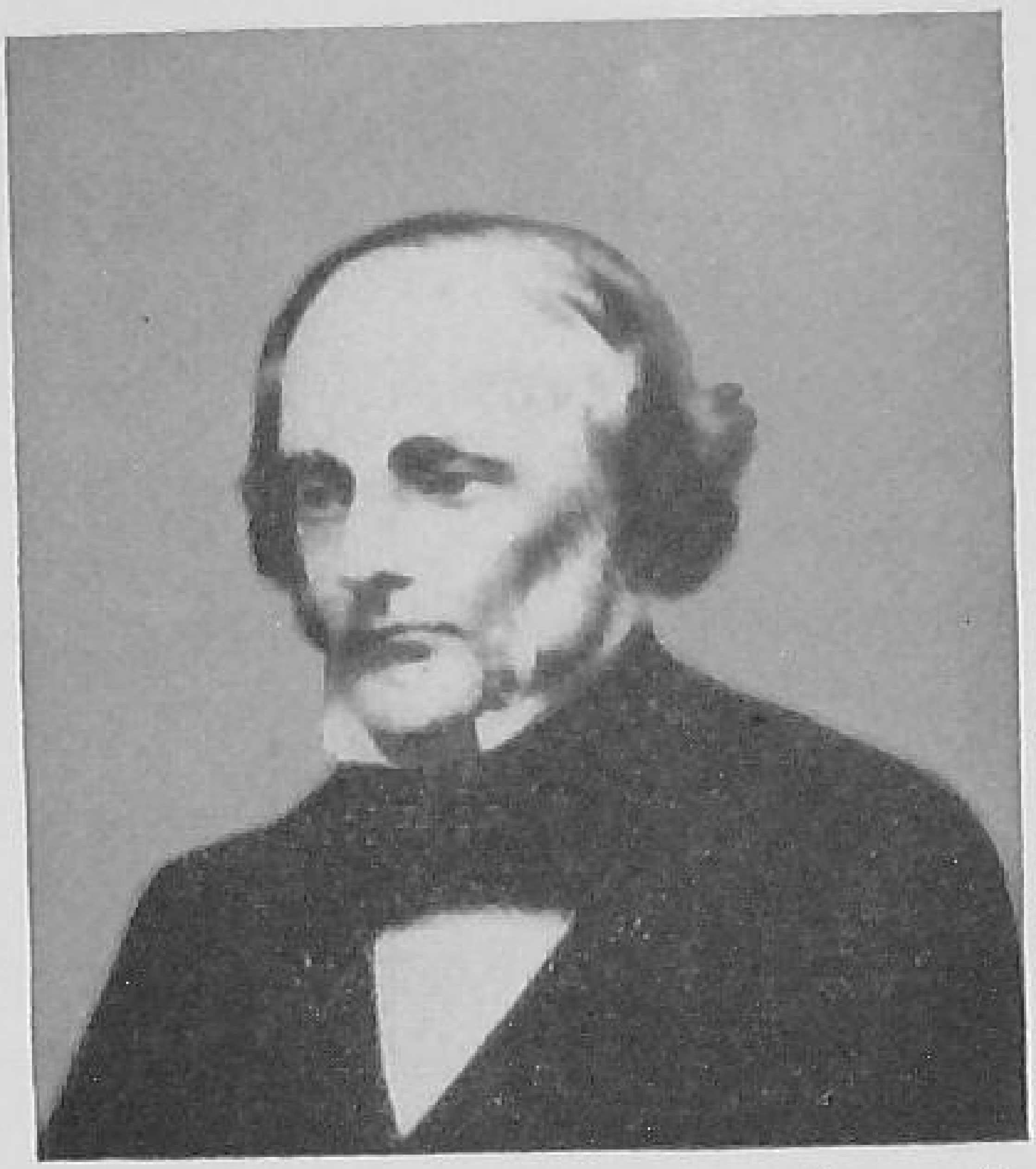

Fig. 20. William Henry Duncan (1805–1863). (*From the collection, New York Academy of Medicine.*)

pointed Medical Officer of Health for the City of London on a full-time basis, and from that day to this there has been a slow recognition that the health of the people can best be protected by entrusting the organization and administration of

Service Act, 1946 (effective July 5, 1949). For a list of the important legislative enactments by the English Parliament, see F. H. Garrison, "History of Medicine," 4th ed., rev. and enl., W. B. Saunders Company, Philadelphia, 1929, pp. 777–778, and W. M. Frazer and C. O. Stallybrass, "Text Book of Public Health," The Willaims & Wilkins Company, Baltimore, 12th ed., 1948, p. 3. At this time activities along these lines were advanced in Germany by Rudolf Virchow (1821–1902) and in France by L. R. Villerme (1782–1863).

[14] W. M. Frazer, "Duncan of Liverpool," Hamish Hamilton Medical Books, London, 1947.

community health to full-time officers, both in urban and rural areas.

John Snow (1813–1858) practiced medicine in London, devoting his main efforts to anesthesia. As early as 1831–1832 Snow had observed numerous cases of cholera in Newcastle-on-Tyne and again in the epidemic of 1848. In 1849 he published a pamphlet, "The Mode of Communication of Cholera," in which he advanced the idea that the poison of cholera was taken directly into the digestive tract by the mouth, and he began to suspect water as the chief medium for carrying the poison. During the cholera epidemic of 1854, Snow began a systematic study of the fatal cases occurring in selected districts of London. He traced the source to the famous Broad Street pump and told the vestrymen that if the handle of the pump were removed the outbreak of cholera would cease, and it did.[15]

William Budd (1811–1880) of North Taunton, Devonshire, England, in 1849 published a paper on "Malignant Cholera" in which he stated that "the human intestine is the sole breeding place of the poison" of cholera, and that water was the principle medium through which cholera was spread. In 1866 Budd stamped out cholera in Bristol, and in 1873 he wrote a monograph on typhoid fever demonstrating its contagious nature and the various modes of its transmission.

The work of these two pioneers reached fruition in the next era.

A movement with far-reaching results in later years was begun by Florence Nightingale (1823–1910) in England. Trained in the Deaconess School under Pastor Theodor Fliedner (1800–1864) at Kaiserswerth, Germany, Miss Nightingale applied her knowledge in the Crimean War at Scutari in 1854. Her success was instantaneous, and upon her return to England a sum of £50,000, known as the Nightingale Fund, was raised to establish a school for nurses at St. Thomas's Hospital,

[15] Samuel C. Prescott and Murray P. Horwood, "Sedgwick's Principles of Sanitary Science and Public Health," The Macmillan Company, New York, 1935, pp. 128–138.

which was opened on June 15, 1860. Her "Notes on Hospitals" (1859) and "Notes on Nursing" (1860) are classics. While she did not know the bacterial theory of infectious disease, she realized that absolute cleanliness, fresh air, pure water, light, and efficient drainage are the surest means of preventing such diseases.

Florence Nightingale cooperated with the Liverpool philanthropist William Rathbone in setting up the first District Nursing Association for the nursing of the sick poor in their homes in 1859. This organization marked the beginning of the modern public health nursing movement.

United States. Health agitation in England did not escape attention in the United States. As early as 1843 Horace Mann urged the value of education for health by means of regular exercise and instruction in hygiene and physiology. These, he insisted, were necessary for the complete education of the individual.[16] One of the earliest investigations[17] into the poverty-disease cycle was by Dr. John H. Criscom (1809–1874) in New York City in 1845. He found much the same conditions as were reported in England. The relationship between the insanitary environment and poverty was investigated by the New York Association for Improving the Condition of the Poor as early as 1845, when it instituted an investigation of the housing situation. Throughout this period the association made sporadic attacks—plans for model tenements (1848), establishment of the Demilt dispensary (1851), investigation of defective dwelling sewerage and filthy streets (1857), popular lectures on hygiene (1860), pure milk (1864), and special sanitary methods to check cholera epidemics (1865). After the organization of the American Medi-

[16] Emmett A. Rice, "A Brief History of Physical Education," A. S. Barnes and Company, New York, rev. and enl. ed., 1936, p. 161.

[17] John H. Griscom, "The Sanitary Condition of the Labouring Population of New York with Suggestions for Its Improvement," Harper & Brothers, New York, 1845.

cal Association[18] in 1847, a standing Committee on Public Hygiene was appointed, which for a few years submitted reports on the health conditions throughout the country.

One of the direct influences of Chadwick's report of 1842 was to stimulate Lemuel Shattuck (1793–1859)[19] of Boston to investigate the health conditions in his state. Shattuck, like Chadwick, a layman, approached the problem of health through the mathematical means of vital statistics. In 1839 Shattuck assisted in founding the first national professional association in the United States–the American Statistical Association. His consistent and continuous interest in the subject led to the passage of an act by Massachusetts in 1842 for the registration of births and deaths.[20] This act became a model for the United States. Shattuck assisted in the preparation of the plans for the United States Census of 1850, and drafted the Act of Congress providing for the census. He included deaths and their causes as a part of the census for the first time in the census figures.

In 1849, with the support of the American Statistical Association, Shattuck, as a member of the legislature, secured the passage of a resolution providing for a Sanitary Commission "to prepare and report to the next General Court[21] a Plan for a Sanitary Survey of the State, embracing a statement of such

[18] American Medical Association, *Transactions*, Vol. 1, 1848 to Vol. 33, 1882. *The Journal of the American Medical Association* succeeded the *Transactions*, beginning Vol. 1, 1882, and continuing to date.

[19] For biographies see George C. Whipple, "State Sanitation," Harvard University Press, Cambridge, Mass., 1917, Vol. 1, pp. 185–188; M. S. M. Walker, "Pioneers of Public Health," The Macmillan Company, New York, 1930, pp. 59–70; Lemuel Shattuck, "Memorials of the Descendents of William Shattuck," Dutton and Wentworth, Boston, 1855, pp. 302–312.

[20] In 1639 Massachusetts had passed a birth and death registration law. This is held to be the first such act in the world.

[21] The legislative body of Massachusetts was known by the title of "The General Court of the Commonwealth of Massachusetts."

facts and suggestions as they may think proper." The three commissioners appointed were Nathaniel P. Banks, Jr., Jehiel Abbott, and Lemuel Shattuck. Like Chadwick, Shattuck was the master mind of the commission and he was mainly, if not entirely, responsible for the report of the commission.[22] Shattuck gives direct credit to Chadwick for the initial stimulation he received in instigating the inquiry.

The report made by Shattuck in April, 1850, is referred to in the public health literature as the "Report of the Massachusetts Sanitary Commission," but its official title was a "Report of a General Plan for the Promotion of Public and Personal Health."[23] The report consisted of 500 pages and 2,000 copies were printed, but it fell stillborn from the printer's hands.[24] The report was divided into four parts: (1) The Sanitary Movement Abroad; (2) The Sanitary Movement at Home; (3) Plan for a Sanitary Survey of the State; and (4) Reasons for Approving the Plan Recommended.

Shattuck's prescience is shown in the following statement:

> . . . Neither do we suppose that the time will ever come, let our sanitary regulations be ever so well matured, when no human being will die of any other cause than old age,—the wearing out of the human machine. But what we anticipate is, a gradual sanitary improvement, a gradual removal and avoidance of the causes of disease, a gradual diminution of human suffering, and a gradual reduction of the number of premature and unnecessary deaths. And there can be no objection to aiming at abstract perfection, and to continuing our efforts at reformation until it is attained.[25]

[22] The "Report" has been a rare-book item for a number of years. It was republished in 1948 in facsimile by the Harvard University Press.

[23] Published at Boston in 1850 by Dutton and Wentworth, State Printers.

[24] Massachusetts did not act on the recommendations until 1869, when it established the first permanent State Board of Health in the United States. See Chap. 16, p. 233.

[25] Lemuel Shattuck, "Report of the Massachusetts Sanitary Commission," 1850, pp. 247–248.

Written in 1850 and in a period when the causes of disease and death were, to say the least, in a state of confusion, this statement can well be considered the charter of a modern community health education program.

In Part 3 Shattuck outlined fifty recommendations for the state to follow in meeting the health needs of the people of Massachusetts. His farseeing grasp of the problem is revealed in these recommendations, some of which have not yet been adopted within any health jurisdiction of the United States.

That Shattuck was familiar with the work of the "Health of Towns Association" is revealed in his discussion of the part education should play in the advance of public health. He described the work of the association in his recommendation Number 37, and said, "We recommend that a sanitary association be formed in every city and town in the State, for the purpose of collecting and diffusing information relating to public and personal health."

He went further into the matter by printing a suggested constitution as a guide to the formation of such an association.

Winslow has characterized this report as "worthy to rank with the best productions of English Sanitary Statesmanship, —I am not quite certain that for breadth and clarity of prophetic vision it is not the most remarkable document in the history of public health."[26]

Just as Chadwick's "Report on an Inquiry into the Sanitary Conditions of the Labouring Population of Great Britain," published in 1842, became the basic guide in the English public health movement, so Shattuck's "Report of the Sanitary Commission of Massachusetts" has become the classic basis for this movement in the United States. No community

[26] C.-E. A. Winslow, "The Evolution and Significance of the Modern Public Health Campaign," Yale University Press, New Haven, 1st ed., 1923, p. 26.

However, Shryock is inclined to think the historical significance of the report is exaggerated.—"The Origins and Significance of the Public Health Movement in the United States," *Annals of Medical History*, 1929, n.s. 1, p. 658, Note 25.

health educator can afford not to know thoroughly the contents of these two publications.

As a result of the International Sanitary Conferences held in Paris in 1851 and 1852, the rapidly spreading fear of a cholera epidemic, and the confused state of quarantine laws in the United States, Dr. Wilson Jewell of Philadelphia prevailed upon the Philadelphia board of health to issue a call for a meeting of state health authorities to consider the problem of quarantine. The first meeting was held in Philadelphia in 1857 and was called the "National Quarantine Convention." The meetings were no sooner under way than there appeared a strong trend "to consider problems of sanitation as well as of quarantine."[27] The second meeting convened in Baltimore in 1858 under the name of the "National Quarantine and Sanitary Convention."[28]

It is clear that the organizers of this convention considered it in the light of "a permanent institution; an association destined to revolutionize the public mind and will, on the great question of Sanitary Legislation."[29] And at the meeting in Boston in 1860 steps were taken to make the convention a permanent organization. But the onset of the Civil War prevented the meeting called for Cincinnati in 1861, and thus what might have become the first American Public Health Association was frustrated.

As a result of the Civil War there was organized the United States Sanitary Commission on June 13, 1861. This was a voluntary organization created in part by the same leaders who had been prominent in the sanitary conventions. The effort of this commission forced a reorganization of the Medical Department of the Army in April, 1862, and introduced a new humanitarian point of view in the care of the armed

[27] R. H. Shryock, "The Development of Modern Medicine," pp. 234–235.

[28] National Quarantine and Sanitary Conventions, Proceedings and Debates, Vols. 1–4, 1857–1860.

[29] Third National Quarantine and Sanitary Convention, Proceedings and Debates, New York, 1859, p. 6.

forces—food, housing, hospitals, camp sanitation, nursing, general relief, and ambulances. In 1867 the commission collected and published a series of contributions relating to the causation and prevention of disease.[30]

A further development occurred in New York City[31] between 1860 and 1866, when the Citizens Association organized a Council of Hygiene,[32] which carried through a systematic sanitary survey in 1864. As a result of this survey the Metropolitan Health District was created by the New York Legislature in 1866 and a Board of Health was organized with Dr. Stephen Smith (1823–1922) as its first health commissioner.

In 1869 Massachusetts passed the first act for the organization of a *permanent* state board of health in the United States.[33] The organization and administration created by this law followed the recommendations made by Shattuck in his report of 1850.

Following the close of the Civil War, a meeting of delegates from all over the country was held on September 12, 1872 at Long Branch, N.J. The call was sent out by Dr. Stephen Smith of New York, and the organization of the American Public Health Association was effected.[34] This is the first permanent professional organization representing in its membership lay and professional workers in the public

[30] Austin Flint (ed.), "Contributions Relating to the Causation and Prevention of Disease and to Camp Diseases," Hurd and Houghton, New York, 1867.

[31] Stephen Smith, "The History of Public Health, 1871–1921," in M. P. Ravenel (ed.), "A Half Century of Public Health," American Public Health Association, New York, 1921, pp. 1–10.

[32] "Report of the Council of Hygiene and Public Health of the Citizen's Association of New York upon the Sanitary Conditions of the City," New York, 1865.

[33] "A temporary acting State Board of Health for Louisiana had been established at New Orleans in 1855 to meet the epidemic of yellow fever." See Garrison, *op. cit.*, p. 779.

[34] Ravenel, *op. cit.*, pp. 13–55, Harold M. Cavins, "National Health Agencies," Washington Public Affairs Press, 1945. See Chap. 16, pp. 205–208, this volume.

health field. The work of this association, through its committees and its publication,[35] has had an enormous influence in establishing a national program of public health.

In the same year (1872) there was begun a journal[36] devoted to public health under the editorship of Dr. A. N. Bell. It was published in Brooklyn and New York. This journal gives a clear picture of the problems and solutions that were current among public health workers at this time.

The Public Health Program. The methods pursued both in England and in the United States in dealing with the problems of disease were rooted in the ideas that had accumulated from primitive times. These ideas related to phenomena that were not clearly understood, such as: (1) isolation; (2) quarantine; (3) lazzarettos, or pesthouses; (4) sanitation; (5) abatement of nuisances; (6) fumigation, or disinfection; and (7) boards of health.

Boards of health first came into being as temporary authorities. They were created with varying degrees of authority to come to grips with the epidemic threats to the communal life. These threats were principally cholera, leprosy, plague, yellow fever, and smallpox. The disease most feared by the people and the governments in this era of sanitation was cholera. But when the epidemic began to subside the interest in the boards of health would wane and ultimately disappear, to be renewed again when a new threat appeared.

Petersburg, Va., in 1780 was the first locality in this country to establish a permanent board of health.[37] New York fol-

[35] American Public Health Association, *Public Health Reports and Papers*, Vol. 1, 1873, to Vol. 34, 1894; succeeded by *American Journal of Public Health*, Vol. 1, 1895.

[36] *The Sanitarian* (monthly), Vol. 1, April, 1873, to Vol. 52, June, 1904; merged with *Popular Science*.

[37] J. A. Tobey, "Public Health Law," Commonwealth Fund, Division of Publication, New York, 3d ed., 1947, p. 11. Tobey assigns the first board of health to Baltimore, Md., in 1793; and the authors of "Hospital Care in the United States" (Commonwealth Fund, Division of Publication, New York, 1947, pp. 468–469) follow John M. Toner,

lowed in 1796 and Baltimore in 1798. Massachusetts passed an act in 1797 making it permissive for certain well-populated communities to establish boards of health. Boston established such a board in 1799, with Paul Revere as president. However, the growth of boards of health was slow, and in 1873 Toner indicated that there were only thirty-seven local health departments in the entire United States.

Hospital and Dispensaries. Growing out of the pesthouses, quarantine stations, fever hospitals, and almshouses of the early eighteenth century, the modern hospital began to emerge. In the third quarter of the nineteenth century hospitals and dispensaries were institutions for the relief of the sick poor. Early in this century the separate care of the insane by the state began to be undertaken, mainly through the heroic and humanitarian efforts of Dorothea Lynde Dix (1802–1887),[38] a native of Maine who began her reforms in Boston. By 1870 there were about fifty public and sixteen private mental hospitals in the United States, with a capacity for 17,000 patients. Most of the hospitals in this period were disgraceful–dirty, unventilated, and contaminated with infections. The neglect and ill-treatment of patients and the high death rate created a popular prejudice against hospitals.[39]

Summary

The era of sanitation began with the appointment of the first Sanitary Commission in 1838 in England and ended with the Centennial Celebration at Philadelphia in 1876, when Dr. Henry I. Bowditch presented the first survey of public hy-

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who, in "Boards of Health in the United States" (American Public Health Association, *Public Health Reports and Papers*, Vol. 1, 1873, pp. 499–521), states that Petersburg, Va., was the first to create such a board.

[38] Helen E. Marshall, "Dorothea Dix–Forgotten Samaritan," University of North Carolina Press, Chapel Hill, N.C., 1937.

[39] Commission on Hospital Care, "Hospital Care in the United States," Commonwealth Fund, Division of Publication, New York, 1947.

giene in America and Dr. Robert Koch reported his success in obtaining a pure culture of the anthrax bacillus on artificial mediums. The era was dominated by two lay statisticians—Chadwick in England and Shattuck in the United States. It saw the first feeble attempts to employ education of the public as a means of attacking the insanitary conditions in the environment. It was based upon the "filth theory of disease" and its objective was the *alleviation* of the effects of disease growing out of insanitary environment. Its methods of operation included (1) isolation, (2) quarantine, (3) fumigation, (4) abatement of nuisances, (5) inoculation, (6) registration of births and deaths, and (7) vaccination against smallpox. The motive force was the use of the "police power" of the state, based upon fear. Its objective was to abate nuisances that were considered the source of epidemics. The sphere of action was on the local basis. Boards of health were local in character and as a rule ineffective. Attempts to deal with water supplies were just beginning. The sanitary inspector was the symbol of this empirical era. There is evidence of the suppression of typhus fever as well as of smallpox and to a certain extent the check of malaria and yellow fever.[40]

While the approach to the problem was wholly *empirical*, yet the results obtained in decreased mortality and morbidity justified all that was done throughout the era. It was a "shotgun" prescription for dealing with the problems of disease and health.

Suggested Reading

Chadwick, Edwin, "Report on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain," W. Clowes and Sons, London, 1842.

[40] Henry I. Bowditch, "Public Hygiene in America," Little, Brown & Company, Boston, 1877; Shryock, "The Origins and Significance of the Public Health Movement in the United States," p. 652; Howard D. Kramer, "Agitation for Public Health Reform in the 1870's," Part I, *Journal of the History of Medicine and Allied Sciences*, Vol. 3, No. 4, 1948, pp. 473–488.

Shattuck, Lemuel, "Report of the Massachusetts Sanitary Commission," Dutton and Wentworth, Boston, 1850.

Bowditch, Henry I., "Public Hygiene in America," Little, Brown & Company, Boston, 1877.

Buck, Albert H., "A Treatise on Hygiene and Public Health," William Wood & Company, Baltimore, 1879.

Simon, Sir John, "English Sanitary Institutions," John Murray, London, 2d ed., 1897.

Hutchins, B. L., "The Public Health Agitation 1833–1848," A. C. Fifield, London, 1909.

CHAPTER 11

ERA OF INFECTIOUS–DISEASE CONTROL, 1877–1903

The first result of the new science of bacteriology founded by Pasteur and Koch was to make precise and definite the shotgun methods of the empirical procedures of the era of sanitation. It ushered in the era of infectious-disease control. Prevention of disease then took on a scientific character. Wherever a pathogenic microorganism could be found as a causative factor, there one found varying definite procedures for the control of the disease.

The second result of this new view of disease was to turn attention away from the environment and toward the individual as the source of danger in the spread of communicable disease.

Bacteriology and Immunology. Pasteur was the pioneer in modern preventive inoculation, and Koch developed the correct theory of specific infectious diseases. It was Koch who in 1876 first cultivated pure cultures of anthrax bacilli,[1] described their full life history, and showed their relation to the disease. This was the first demonstration of the causal relation of a pathogenic microorganism to a specific disease. Koch's invention of the solid-medium method of isolation in 1875, first as a gelatin-tube method and in 1883 as a plate

[1] Casimer Davaine (1812–1882) in 1863 discovered the bacillus of anthrax and showed that the virulence of the disease was in proportion to the number of bacteria present; Arnold C. Klebs (1870–1943) in 1871 established that anthrax virus was nonfiltrable since the filtrate would not produce the disease.

method, together with his improvement on Weigert and Ehrlich's staining methods, laid the foundation on which all subsequent bacteriological investigation was erected.[2]

The third result of the new science was that cultured organisms could be attenuated, and thus was established the process of artificial immunity.[3]

This discovery by Pasteur was extended by Emil von Behring (1854–1917), a Prussian army surgeon, who first demonstrated in 1890–1893 that the serum of animals immunized against attenuated diphtheria toxins could be used as a preventive or therapeutic inoculation against diphtheria in other animals through a specific neutralization of the toxin of the disease. Elie Metchnikoff (1845–1916), an eminent Russian biologist, showed how ameboid cells in the connective tissues and the blood engulf solid particles and bacteria and destroy bacteria by absorbing them. He called these cells "phagocytes" and showed how they functioned as scavengers. The process was called "phagocytosis."

Between 1877 and 1904 a long list of discoveries of bacterial origin of diseases was produced. Among the chief ones were: traumatic infections (Koch, 1878); leprosy (Hansen and Neisser, 1879); gonococcus (Neisser, 1879); pneumococcus (Pasteur, Sternberg, 1880); typhoid (Eberth, Koch, 1880); malaria (Laveran, 1880); tubercle bacillus (Koch, 1882); streptococcus (Koch and Ogston, 1882); cholera (Koch, 1883); diphtheria (Klebs, 1883); Texas fever (Smith, 1892); and plague (Kitasato, Yersin, 1894).

In 1878 Patrick Manson discovered that transmission of the disease filariasis was by mosquitoes. In 1900 the United States Army Commission on Yellow Fever established the proof that mosquitoes were the means for spreading the disease. The work of Major Walter Reed, James Carroll, Jesse W. Lazear,

[2] Frederick P. Gorham, "The History of Bacteriology and Its Contribution to Public Health Work," in M. P. Ravenel (ed.), "A Half Century of Public Health," American Public Health Association, New York, 1921, p. 71. By permission.

[3] See Chap. 7, p. 80, and Chap. 8, p. 90.

and Aristide Agromonte in Havana is one of the dramatic episodes in the annals of preventive medicine.[4]

X rays and Radium. In 1895 Wilhelm Roentgen (1845–1923) of Würzburg, Germany, discovered that photographic plates fogged when the gas in tubes was largely exhausted. Applied to the human body X rays revealed the bony structure. In 1897 Cannon demonstrated that X-ray photography would reveal the processes taking place in the gastrointestinal tract. Refinements in the use of the X rays has made it one of the most powerful exploratory tools in modern medicine and surgery.

In 1896 Henri Becquerel (1852–1908) of Paris observed that uranium emitted radiation which fogged photographic plates. This led Pierre and Marie Curie of Paris in 1900 to their discovery of radium.

These revelations are on a par with the discoveries of percussion in the eighteenth century and auscultation in the nineteenth century.

Application to Public Health. Practical application to public health of these newer developments was that the control of communicable diseases required prompt notification of the occurrence of each disease and isolation of the individuals affected by them. This led to the necessity for means of early diagnosis, and this in turn led to the establishment of bacteriological and chemical laboratories as aids to such diagnosis.

Quarantine. The term "quarantine"[5] has been used to cover a variety of procedures. Originally it signified merely isolation—the segregation of those afflicted with diseases

[4] Howard A. Kelly, "Walter Reed and Yellow Fever," the Remington-Putnam Book Company, Baltimore, 1906; Albert Ernest Truby, "Memoir of Walter Reed, the Yellow Fever Episode," Paul B. Hoeber, Inc., New York, 1943.

[5] Hugh S. Cumming, "The United States Quarantine System during the Past Fifty Years," in Ravenel, *op. cit.*, pp. 118–132.

thought to be communicable. To most people quarantine still conveys the meaning of detention only—restraint under isolation or with limited communication. Bacteriological discoveries have modified quarantine regulations so that today definite periods of incubation determine the period of quarantine. Fumigation became a fetish and was effective largely because it destroyed mosquitoes, lice, and rats rather than bacteria as such. Quarantine regulation was in the hands of local and state authorities until 1878, when the Marine Hospital Service was given authority to take over the responsibility. The complete nationalization of quarantine procedures was not accomplished until 1921.

Contagious-disease Hospitals. In 1701 the colony of Massachusetts passed an act requiring towns to provide places for the isolation of smallpox, but it was two hundred years before such a requirement was made for other contagious diseases. As late as 1873 New York City, besides its smallpox hospital, had only two small wards on Blackwell's Island designed primarily for typhus fever. And in 1900 there were probably not more than twenty-five or thirty contagious-disease hospitals in the United States, and these were mostly small.

Between 1840 and 1900 the significance of hospital development began to change. The basic contributions to this change came from the demonstration of ether anesthesia in 1847 by William T. G. Morton (1819–1868), the changed concept of nursing service and nursing education instituted by Florence Nightingale in 1858, the introduction of antiseptic surgery by Joseph Lister in 1867 based upon the work of Pasteur, and the discovery of the X ray by William Roentgen in 1895. Hospitals began to undergo drastic changes in purpose and number. Hospitals formerly had existed to supply food, shelter, and meager medical care to the pauper sick, to armies, to those infected with contagious diseases, to the insane, and to those requiring emergency treatment. Now they began to provide skilled medical, surgical, and nursing care to all people.

Laboratories. In 1879 the first hygienic institute in the world was opened in Munich under the direction of Max von Pettenkofer. It had been authorized in 1872 and was to be devoted to research in all phases of public hygiene. Garrison notes that William C. Cornfield established the first public health laboratory in England in 1875. The first research laboratory in the United States was founded in 1884 by Andrew Carnegie in connection with the Bellevue Hospital Medical College in New York City. In 1892 the University of Pennsylvania established the first hygienic laboratory in this country. In 1888 the Pasteur Institute was opened in Paris, and in the same year a bacteriological laboratory was organized under the Board of Health in Providence, Rhode Island, by Gardner T. Swarts. The hygienic laboratory of the United States Marine Hospital Service (later to become the United States Public Health Service) was established in New York City in 1888, and in 1891 it was moved to Washington, D.C. When Dr. Swarts later was elected secretary of the Rhode Island State Board of Health he established the first state laboratory on September 1, 1894.

During the threatened invasion of cholera in 1892, Dr. Hermann M. Biggs persuaded the New York City Board of Health to establish a diagnostic laboratory. It was so successful in meeting the problem that in 1893 Dr. Biggs was enabled to offer the services of the laboratory to assist in the diagnosis of diphtheria, and in 1894 he secured authority for the free distribution of antitoxin. The work of this laboratory was for diagnosis of disease, for the preparation of curative antitoxins and vaccines, for the investigation of epidemics, for the control of water supplies and sewage disposal, and for research.

After 1877 the spread of bacteriological and chemical laboratories as parts of the public health program became very rapid. However, Chapin notes that in 1900 there were nine out of the forty largest cities without such laboratories. Today, every health department has access to laboratory facilities as a routine part of its program of community protection.

Sanitary Engineering. Along with the ever-widening vista of the control of communicable disease through the sciences of bacteriology and immunology, there developed the social need for control of water supplies, sewage disposal, and destruction of solid refuse. Engineering science in the 1840's and 1850's began to introduce urban water systems. Filtration of water began in England as early as 1829 and was made compulsory for London in 1855. In 1869 James B. Kirkwood published his comprehensive report on water filtration in Europe, based upon studies made in 1866 for the city of St. Louis, Mo. In 1872 the first filtration plant was installed for the city of Poughkeepsie, N.Y., to clarify the water of the Hudson River.

The first and most important scientific study of water purification and sewage treatment was established at the Lawrence (Mass.) Experiment Station by the Massachusetts State Board of Health in 1887. By 1893 a sand filter had been installed at Lowell, Mass., and it was proved conclusively that polluted water could be made safe for drinking purposes. Between 1895 and 1902 water purification became a practical public health procedure.[6] In 1894 the American Public Health Association began its work in the standardization of water analysis.

Sewage disposal by septic tanks was suggested in 1895 and became general at the turn of the next century. After these problems were solved, those relating to solid refuse began to demand attention. In 1874 Frazer at Nottingham, England, built the first furnace for effectively destroying garbage and domestic rubbish. In the United States furnaces were built to incinerate garbage. The first one built was located on Governor's Island, New York City, in 1885.

Food. Next to water supply, sewage disposal, and refuse removal the problem of food supply has demanded constant

[6] George C. Whipple, "Fifty Years of Water Purification," in Ravenel, *op. cit.*, pp. 161–180; Rudolph Hering, "Sewage and Solid Refuse Removal," *ibid.*, pp. 181–196.

attention. Food and milk conservation and preservation began with the ancient drying process first applied to fish and then to fruits and later to vegetables. The work of Pasteur and Koch gave new direction and effectiveness to the entire food problem.[7] Since 1886 the growth of this industry has been tremendous. The canning industry has been established on a scientific basis. Refrigeration and rapid transportation have changed the food habits of nations. All these developments made for an improved standard of living and consequent better health. Pasteurization has robbed these earlier sources of their power to spread communicable diseases.

Air and Ventilation. Prior to 1895 there was general belief that air was poisoned by carbon dioxide and other substances given off by the body and that the supply of oxygen in places of normal habitation could be reduced to a harmful level. Ventilation was practiced chiefly to regulate the chemical characteristics of inspired air. By 1900 the carbon dioxide-oxygen theory of ventilation had been completely disproved. Today the chief function of air conditioning is to promote and maintain health and comfort by assisting the heat-regulating mechanism of the body. It is concerned with the temperature, humidity, and velocity of the air.[8]

Housing. In the early investigations of Chadwick and Griscom in 1842 the relation of bad housing to disease was revealed. The struggle to overcome the deleterious effect of housing has continued from that day forward. The need for better homes among the poor was urged from 1846 onward by Robert M. Hartley through the New York Association for Improving the Condition of the Poor. This was supplemented in 1873 by the State Charities Aid Association. But it was not until 1898, with the establishment of the Tenement

[7] Samuel C. Prescott, "Food Conservation," *ibid.*, pp. 221–235, and Charles E. North, "Milk in Its Relation to Public Health," *ibid.*, pp. 236–289.

[8] George T. Palmer, "What Fifty Years Have Done for Ventilation," *ibid.*, pp. 335–360.

House Committee of the Charity Organization Society of New York, under the direction of Lawrence Veiller, that a consistent and persistent public education program brought about needed reforms. It was this movement that set the pattern and suggested methods for later social reform movements.[9]

While these scientific approaches to the public health problems of the community were developing, the social aspect of disease began to be investigated. In connection with the Chicago World's Fair there was held one of the earliest meetings in the United States at which health was the main topic of discussion. From June 12 to 17, 1893, the International Congress of Charities, Correction and Philanthrophy[10] devoted one section to hospitals, dispensaries, and nursing. This congress made a deep impression on the public mind. It is in this period that we see faint beginnings of organized health education of the individual both in the community and in the school.

Public Health Organization. The effect of the new knowledge concerning man and his environment was reflected in legislative enactments to provide community organization and administration. In England the great Public Health Act of 1875 was passed, based largely upon the investigations of Dr. John Simon and Dr. William Farr. Changes in approach to the problem of disease from the miasmatic theory to the role of pathogenic microorganisms were incorporated in this legislation. In the United States an attempt was made to bring about similar changes in 1879, when the National Board of Health[11] was organized by legislative enactment of Congress. The immediate cause for this act was the threatened epidemic of yellow fever in the Southern states, particularly Louisiana.

[9] Edward T. Devine, "When Social Work Was Young," The Macmillan Company, New York, 1939.

[10] "Hospitals, Dispensaries and Nursing," International Congress of Charities, Johns Hopkins Press, Baltimore, 1894.

[11] Robert D. Leigh, "Federal Health Administration in the United States," Harper & Brothers, New York, 1927, pp. 464 *ff*.

In this episode the conflicting ideas of quarantine and of sanitation were brought face to face. The National Board of Health was empowered to investigate and advise and to enforce national quarantine regulations. In 1882 the duties of the board were restricted. Congress refused to continue the board after 1886 by withholding appropriations, and it officially ceased to exist in 1893. In 1880, through the influence of Dr. John S. Billings (1838–1913), the United States Census Bureau established the registration area. In 1902 the United States Marine Hospital Service was reorganized and became the Public Health and Marine Hospital Service.

Child Welfare. With the organization of the New York Society for the Prevention of Cruelty to Children in 1875, it may be said that attention to the lot of children was begun in this country. The emphasis was upon the provision of shelter and the prevention of cruelty. In 1893 Nathan Straus established in New York City the first milk stations for babies. But beyond these first feeble efforts to deal with the high infant-mortality problem, the real beginning of child welfare work in the United States did not take place until the next period of development in the public health movement.

Public Health Nursing. Growing out of the work of Florence Nightingale in London and of William Rathbone in Liverpool, the visiting nursing movement began in the United States in 1877, when the Woman's Branch of the New York City Mission started a nursing service in the homes of the sick poor along denominational lines. The growth of visiting nursing associations, beginning in Buffalo in 1885, slowly spread to the larger cities of the country. The combination of educational health propaganda and bedside care was begun by the Boston Instructive District Nursing Association in 1886. Industry began the employment of nurses as early as 1895, when the Proctor Marble Company in Vermont sent nurses into the homes of sick employees. Public school nursing began in 1903 as an experiment between the Henry Street

Settlement in New York City and the New York City Board of Education. The Henry Street Settlement offered to place a nurse experimentally in the four schools showing the greatest number of exclusions. The objective was to prove the possibility of safely keeping the majority of excluded children in school. The point was proved and school nurses were appointed by the city.

School Hygiene. Prior to 1880 there is little evidence of concern by the schools in the United States about the health and physical welfare of the child. However, such interest was developed abroad early in the century.[12] In 1833 the French government passed a law making school authorities responsible for the sanitary condition of school buildings and for the health of children. In 1842 France required that physicians should regularly inspect all schools. Similar developments are to be found in Sweden (1868), Germany (1869), Russia (1871), Austria (1873), and Belgium (1874).

In 1850 Massachusetts made the teaching of physiology mandatory. However, it was with the organization of the Woman's Christian Temperance Union in 1874 that the program for the teaching of physiology and hygiene began. During the decade of 1880 to 1890 every state in the United States had passed a law requiring instruction concerning the physiological effects of alcohol and narcotics. These laws in most instances required that such instruction should be a part of the broader program of instruction in physiology and hygiene.

Another development was derived from the widespread interest in physical education as introduced in Germany and Sweden. The first school gymnasium in the United States was established in 1825, with progress slow until about 1890, when gymnastics were quite generally introduced into the public schools. Kansas City, Mo., appointed the first director

[12] T. D. Wood and H. G. Rowell, "Health Supervision and Medical Inspection of Schools," W. B. Saunders Company, Philadelphia, 1927, pp. 20–25.

of physical education in 1885, and in 1892 Ohio passed the first state law requiring physical education in the public schools of cities of the first and second class. These steps mark the early stages of the three major divisions of the present-day school health program—health service, health education, and physical education.

Medical Inspection in Public Schools. The idea of the medical inspection of school children goes back to the work of Johann Peter Frank, who outlined child care as a part of "medical police" in his great work. But it was not until the last half of the nineteenth century that his ideas had practical application in France, Germany, Sweden, and Belgium. In 1874 school medical inspection was first established in Brussels, Belgium. By 1900 most of the large cities in Germany employed school physicians. In England the London School Board voluntarily appointed a medical officer in 1890. In the United States medical inspection in the public schools began in New York City in 1892. But the real beginning of this work occurred in Boston in 1894, when the city appointed fifty physicians for the schools to inspect children for the detection of contagious and other diseases. In 1903 the Board of Education in Reading, Pa., employed the first school dentist to examine the teeth of school children.

Mental Hygiene. In 1900 Sigmund Freud (1856–1939), a young Austrian physician specializing in neurology, published his work "Studies in Hysteria." Freud in his psychoanalysis developed a new technique for delving into the human mind and emotions. The X ray discovered in 1895 made it possible to "see" inside the human body, and Freud made it possible to "see" inside the human mind.

Tuberculosis. Throughout this era and for hundreds of years earlier tuberculosis was endemic throughout the world. It was by far the greatest cause of mortality, and helpless fear of the disease was prevalent everywhere. Koch discovered the tubercle bacillus in 1882 and held out promise of a cure

along the lines of a vaccine, but he failed in his endeavor. In his classic paper "The Aetiology of Tuberculosis" Koch concluded with this sentence: "When the conviction that tuberculosis is an exquisite[13] infectious disease has become firmly established among physicians, the question of *an adequate campaign against tuberculosis*[14] will certainly come under discussion and will develop itself."

The sanatorium care of the tuberculous in the United States is generally dated from the establishment in 1885 of the Adirondack Cottage Sanatorium at Saranac Lake, N.Y., by Dr. Edward L. Trudeau. This institution was patterned after those of Peter Dettweiler's Sanatorium at Falkenstein, Germany (1876), and Hermann Brehmer's institution at Görbersdorf, Germany (1859).

In 1887 Robert Philip (1857–1939) of Edinburgh opened the Victoria Dispensary for Tuberculosis and began the sociomedical attack upon the disease. The basic premise in this effort was the instruction of patients about the treatment and prevention of the "Great White Plague."[15]

Dr. Hermann M. Biggs (1859–1923) of the New York City Health Department, in 1889, presented a report on the prevention of tuberculosis. This report marks the first attempt in the United States at organized official effort to combat tuberculosis. In the report it is stated, "A large number of leaflets, however, were printed and distributed giving the essential known facts regarding the communicability of tuberculosis." A campaign of education had begun.

In 1892 Dr. Lawrence F. Flick (1856–1938) of Philadelphia organized the first social effort in the world against a specific disease—The Pennsylvania Society for the Prevention of Tuberculosis. A campaign of popular education was now begun to teach the cause of the disease, its method of spread, and means of prevention. This was the beginning of a long

[13] Probably the meaning Koch had was the word "specific."

[14] Italics not in original.

[15] Oliver Wendell Holmes, in "Elsie Venner" in 1861, first used the phrase to describe tuberculosis.

line of unofficial health organizations that sprang up in this country to combat other specific diseases.

The struggle to secure the compulsory notification of tuberculosis by practicing physicians, initiated by Hermann M. Biggs in New York City, culminated in an enactment by the New York City Board of Health in 1897. This marks the beginning of the official administrative control of the disease in the United States.

The first municipal sanatorium for tuberculosis supported by tax funds was established in Cincinnati, Ohio, in 1897, and the first state sanatorium was opened in Massachusetts in 1898. The first tuberculosis clinic under municipal auspices was opened at Gouverneur Hospital in New York City in 1903.

Summary

The concept of prevention first propounded by Johann Peter Frank now received scientific support. Prevention of epidemic diseases became the first and most important duty in the public health movement. The emphasis was away from "mathematical and mechanical" aspects of disease and toward a study of the biological problems. There was a rapid growth of the laboratory, both bacteriological and chemical, as a tool in making diagnosis of epidemic disease. Throughout the period the objective was the *suppression of disease*. The activities were largely directed to protection of the individual from exposure to infections. Science began to supplement empiricism in elucidating the nature of disease. The laboratory technician loomed importantly over the sanitary policemen of the preceding era. The sphere of action was local with an awakening on the part of the state units. Throughout this period the motive power continued to be fear of disease, and police power continued to be relied upon as a method of solving the problem.

Upon these foundations and ideas the present-day public health movement slowly took form. This era proved to be one of the most productive periods in man's control over disease.

Suggested Reading

Ravenel, M. P. (ed.), "A Half Century of Public Health—Historical Volume," American Public Health Association, New York, 1921.

Newsholme, Sir Arthur, "The Story of Modern Preventive Medicine," The Williams & Wilkins Company, Baltimore, 1929.

Newman, Sir George, "The Rise of Preventive Medicine," Oxford University Press, New York, 1932.

Rice, Emmett A., "A Brief History of Physical Education," A. S. Barnes and Company, New York, 1936.

Cook, Sir Edward T., "The Life of Florence Nightingale," The Macmillan Company, New York, 1942.

Cavins, Harold M., "The National Quarantine and Sanitary Convention and the Beginnings of the American Public Health Association," *Bulletin of the History of Medicine*, Vol. V, No. 13, 1943.

Frazer, William M., "Duncan of Liverpool," Hamish Hamilton Medical Books, London, 1947.

CHAPTER 12

ERA OF HYGIENE, 1904–1919

As has been noted, the era of sanitation was concerned with the *alleviation* of the impact of disease, based upon the sanitary control of the *environment*. The next era of infectious-disease control was directed to the *suppression* of disease, based upon *bacteriology*. The era of hygiene was based upon the concept of the *prevention* of disease through control of the individual health by means of *education*.

The period between 1904 and 1919 marks a tremendous advance in the public health movement in the United States in the fields of sanitary engineering, bacteriology and immunology, nutrition, public health nursing, health education in the schools and the community, official health organization and administration, and unofficial public health organization.

Sanitary Engineering. The principles developed in the preceding eras governing the protection of water supplies, the disposal of sewage, the installation of sewer systems, the removal of solid refuse, the cleaning of streets, and the ventilation of public buildings became widely understood and practiced. In 1910 Major Carl Rogers Darnell of the United States Army Medical Department originated the method of introducing chlorine gas into water supplies. This method has since been adopted throughout the world. Typhoid fever no longer remained an index to a community's health consciousness; it practically disappeared as a health problem.

Bacteriology and Immunology. Investigations as to causative organisms in disease continued with unabated enthusiasm. In 1905 Schaudinn discovered the parasite of syphilis, Bordet and Gengou isolated the bacillus of whooping cough, and

Dutton and Koch demonstrated the tick transmission of African relapsing fever. In 1907 Ricketts demonstrated tick transmission of Rocky Mountain fever.[1] In 1911 McCoy and Chapin isolated the bacillus of tularemia. In 1917 Ruth Tunnicliff discovered the diplococcus in measles. These were the major bacteriological contributions in the era under consideration.

At the same time investigators were pursuing the problems involved in immunology. In 1906 Wassermann introduced his serum diagnosis of syphilis, and von Pirquet announced his doctrine of allergy. In 1907 von Pirquet introduced the cutaneous reaction in tuberculosis, and Theobald Smith suggested the use of toxin-antitoxin in diphtheria, which was used successfully in 1912 by von Behring. In 1909 Erhlich produced "606" as a treatment for syphilis, and in the same year F. F. Russell introduced vaccination against typhoid fever in the United States Army. In 1913 Schick introduced his susceptibility test for diphtheria, and the test was first used by the New York City Department of Health. In 1916 Bull introduced antitoxin for gas gangrene. In 1918 toxin-antitoxin was first used by the New York City Department of Health. Chemotherapy now began to assume importance of more promise than serum therapy.

These contributions by bacteriology and immunology gave additional evidence of the effectiveness of the attack upon the causative factors in disease, especially the epidemic diseases. As these newer facts were revealed there began to be evidence that, while the pathogenic microorganisms were important, there were other factors involved in disease. Man's "constitution" came to be studied as a factor. Sir William Osler pointed out the problem when he described the conditions necessary for the production of communicable diseases as the seed (the pathogenic microorganism) and the soil (man's constitution).

[1] Esther Gaskins Price, "Fighting Spotted Fever in the Rockies," Neagele Printing Company, Helena, Mont., 1948. This is an excellent popular account of this dramatic episode in public health.

Ascertainment of Facts. A new direction was given in this era to the process of ascertainment of the facts about disease initiated as long ago as 1838 in England. In 1907 an intensive survey[2] was made in Pittsburgh, Pa., under the auspices of the Charities Publications Committee of New York. This survey was both social and sanitary. It was financed by the Russell Sage Foundation of New York. A widespread citizen interest was created both in carrying out the actual work of the survey and in the subsequent utilization of the recommendations.[3]

The Russell Sage Foundation sponsored numerous health surveys prior to 1920. Brooks and Meader prepared a rating form for the comparative study of the cities[4] of New York State in 1919.

[2] Distinction should be made in the types of surveys. A *health survey* is an investigation conducted by a trained corps of workers in order to determine the exact status of those conditions which may affect the health of a community directly or indirectly.

Surveys have been made of health departments—local and state—where the emphasis is upon an examination of the organization, personnel, program, and finances.

Closely allied with these types of survey is the *demonstration, e.g.*, Framingham Community Health and Tuberculosis Demonstration; Child Hygiene at Mansfield, Ohio; Fargo, N.D.; Cattaraugus County, N.Y.; Syracuse, N.Y.; and, Bellevue District, New York City.

Some of the earliest sanitary surveys which commanded wide attention were in 1842: Edwin Chadwick, "Report on an Inquiry into the Sanitary Conditions of the Labouring Population of Great Britain"; 1850, Lemuel Shattuck, "Report on the Sanitary Conditions of Massachusetts"; 1875, John S. Billings, "Report of the Committee on the Plans for Systematic Sanitary Survey of the United States: with Remarks on Medical Topography, Public Health Reports and Papers," American Public Health Association, Vol. II, 1876, pp. 41–54.

[3] M. P. Horwood, "Public Health Surveys," John Wiley & Sons, Inc., New York, 1921.

Haven Emerson, "Public Health Diagnosis," Fifth Sedgwick Memorial Lecture at Massachusetts Institute of Technology, Chicago, 1927.

Allen Eaton and Shelby M. Harrison, "A Bibliography of Social Surveys," Russell Sage Foundation, New York, 1930.

[4] P. B. Brooks, "The Scoring of Health Activities in Cities of New York State," *American Journal of Public Health*, Vol. IX, 1919, pp. 436–439.

Great Britain—National Insurance Act. Great Britain was the first country in the world to establish national compulsory unemployment insurance in the act passed by Parliament in 1911. The act was "to provide for insurance against loss of health and for the prevention and cure of sickness and for the insurance against unemployment. . . ." At the same time health insurance was adopted to a limited degree. Under this act benefits were of two kinds: (1) cash benefits after a three-day waiting period, up to twenty-six weeks, and a pension for invalidity without time limit; and (2) a maternity benefit. In 1916 the system was extended to additional groups of workers. In 1919 the Ministry of Health was formed by the amalgamation of the Local Government Board (1871) and the Insurance Commissioners (1911).

Workmen's Compensation. Workmen's compensation legislation[5] began first in the United States with a Federal act of 1908, applying only to a few Federal employees, but in 1911 the first act was passed by the state of Washington as a means to combat the existing statutory and common-law liability of employers for injuries suffered by their workmen. These new laws entirely eliminated the question of negligence and provided definite and immediate benefits for the injured. By 1917 this remedy had been accepted by a majority of the states. Today all but one state (Mississippi) have such laws on their statute books. Practically all the laws require payment of medical costs. The Massachusetts law provides for the payment of compensation for disabilities due to industrial diseases as "personal injuries," and this principle is today found in the laws of a number of states. Two states—California and Rhode Island—have enacted laws providing cost benefits to employees suffering wage loss due to nonindustrial accidents or diseases.

[5] John B. Andrews, "Health Promotion through Legislation for Insurance," Proceedings, Conference of State and Provincial Health Authorities, 1919.

Clarence Hobbs, "Workmen's Compensation Insurance: Including Employers' Liability Insurance," McGraw-Hill Book Company, Inc., New York, 1939.

Compulsory Sickness Insurance. In 1912 the American Association for Labor Legislation created the National Committee on Social Insurance and organized the first national committee on social insurance and organized the first national conference[6] on the subject in 1913. In 1915, with the help of a committee of the American Medical Association, a tentative draft for a health insurance bill was prepared, which came to be known as the "Standard Bill." By 1918 the bill had been revised twice.

In 1916 the U.S. Public Health Service[7] published a bulletin outlining the subject of health insurance and its relation to public health.

Health insurance bills were introduced in three states in 1915 and in twelve states in 1917, but none of these bills reached the statute books. In 1917 commissions were created in eight states to investigate and report on health insurance. Revival of interest in this subject came with the work of the Committee on Costs of Medical Care (1927–1932).

Children's Bureau. An era of development of nationwide concern for children was initiated in 1909 by the Conference on the Care of Dependent Children held at the call of President Theodore Roosevelt. This conference recommended that the United States Children's Bureau be created. Congress passed an act in 1912 to provide for the Bureau in the U.S. Department of Labor and authorized it "to investigate and report upon all matters pertaining to the welfare of children and child life among all classes of our people." The act specifically provided that the Bureau should investigate "the questions of infant mortality, the birth rate . . . , dangerous occupations, accidents, and diseases of children. . . ."

[6] Nathan Sinai, Odin W. Anderson, and Melvin L. Dollar, "Health Insurance in the United States," Commonwealth Fund, Division of Publication, New York, 1946.

[7] B. S. Warren and Edgar Sydenstricker, "Health Insurance: Its Relation to Public Health," U.S. Public Health Service, Washington, D.C., *Bulletin* 76, 1916.

This conference focused attention on the many inadequacies in the services available to children. After the establishment of the Children's Bureau, the newly developing concept of public responsibility for individual welfare became a fixed part of the Bureau's operation.

Child Hygiene. Child hygiene evolved from early unofficial efforts to reduce the infant death rate in large cities. The first municipal division of child hygiene was established by the New York City Department of Health in 1908. In 1914 the New York State Department of Health established the first state child health bureau, and from that date forward the establishment of such divisions was rapid.

Dental Hygiene. In 1907 the Oral Hygiene Committee of the National Dental Association was created for the purpose of emphasizing the close relationship of dental defects to the general health of the individual. In 1909 a school dental program was inaugurated in Cleveland, Ohio. In 1910 dental clinics for children were opened in Rochester, N.Y., and in Boston, Mass. In 1918 the North Carolina State Board of Health created the first dental division in a state health department. Prior to 1930 dental-hygiene public policy was directed mainly to provision of dental services for underprivileged children.

White House Conference. Another conference, the "Children's Bureau Conference on Child Welfare Standards," was held in 1919. This was not, strictly speaking, a "White House Conference," although it was financed from a Presidential fund and had the sanction of President Woodrow Wilson. It formulated minimum standards, among which were those relating to public protection of the health of children and mothers.

Nutrition. Increased interest in child hygiene soon revealed an important segment of the school population as either mal-

nourished or undernourished. A program to combat this situation developed through the establishment of *school lunches*. The first such program was undertaken in New York City in 1910. Thereafter it spread rapidly throughout the country.

Between 1911 and 1914 Casimir Funk began his investigation of the "vitamines." Subsequently it was found that not all the substances belonged to the "amine" group of chemical compounds, so the final *e* was dropped. Between 1913 and 1916 McCollum, Wendel, and Osborn defined two accessory food factors essential for the maintenance of nutrition and of normal growth—vitamin A, a fat-soluble, growth-stimulating vitamin; and vitamin B, a water-soluble vitamin. By 1915 the reality of vitamins and their influence on growth, health, and fertility was firmly established.[8]

Campaign against Tuberculosis. With the growing knowledge about the medical and social character of tuberculosis and the improvement in vital statistics that had slowly manifested itself between 1850 and 1900, the medical profession and social workers turned attention to ways and means of attacking the disease. After several false starts, growing out of the ideas[9] inherent in the words *treatment* and *prevention*, the National Tuberculosis Association was organized in 1904. The original contention advanced by Edwin Chadwick in the era of sanitation that people were poor because they were sick now began to be supplemented by the statement that people were sick because they were poor.

Tuberculosis did not appear to yield to improved sanitation or to immunization through serological methods. The one effective treatment seemed to be along the line of increasing

[8] Iago Galdston, "Progress in Medicine—A Critical Review of the Last Hundred Years," Alfred A. Knopf, Inc., New York, 1940, Chap. VI, "The Challenge of Nutrition," pp. 114–150.

[9] Robert G. Paterson, "Antecedents of the National Tuberculosis Association," Historical Series 2, National Tuberculosis Association, 1945.

human resistance by more hygienic living. Three main lines developed in the attempt to solve this problem: (1) the sanatorium movement initiated by Edward Livingston Trudeau at Saranac Lake, N.Y., in 1885 (treatment by hygienic living); (2) the official health department attack upon the disease developed by Hermann M. Biggs in New York City in 1889 (prevention through official administration); and (3) the unofficial organization of medical and lay forces by Lawrence F. Flick of Philadelphia in 1892 (prevention through individual and community education) to bring education into play to secure legislative enactments providing the necessary agencies to deal with the disease.

While attention was given to human tuberculosis, another development attempted to control tuberculosis in animals. In 1917, under the auspices of the Bureau of Animal Industry, U.S. Department of Agriculture, there began a campaign for eradication of tuberculosis among dairy cattle based upon the accredited herd and area plan.[10] This program was successful in eliminating milk as a carrier of tuberculosis. Skin, gland, and bone tuberculosis all but disappeared as a disease among children.

Health Education. *Through Nursing Services.* Control of individual health through education began with a systematic endeavor toward the prevention of disease. The use of the visiting nurse (now specialized as the tuberculosis, industrial, or school nurse) for educating the individual in the home, factory, and school began to grow slowly.[11] In 1909 the Metropolitan Life Insurance Company started home nurs-

[10] J. A. Myers, "Man's Greatest Victory over Tuberculosis," Charles C. Thomas, Springfield, Ill., 1940.

H. R. Smith, "Bovine Tuberculosis in the United States," *American Review of Tuberculosis*, Vol. 50, No. 6, December, 1944, pp. 520–533.

John Francis, "Bovine Tuberculosis including a Contrast with Human Tuberculosis," Staples Press, Ltd., London, 1947.

[11] Mary S. Gardner, "Public Health Nursing," The Macmillan Company, New York, 3d rev. ed., 1945.

ing for its industrial policyholders. A formal course in public health nursing was established in 1910 at Teachers College, Columbia University. In 1912 the American Red Cross established its rural nursing service, and in this same year the term "public health nurse," which had been coming into use for several years, became general when the National Organization for Public Health Nursing was organized. The public health nurse was the means through which the process of personal hygiene by individual education became established as a part of the public health movement. From this date on the public health nursing program became recognized as an essential part of the official public health department—local, state, and national.

Health Education Activities. With the increase in industrialism and urbanization after 1900, the environmental conditions surrounding the life of the individual changed rapidly and radically. The enormous increase in basic knowledge respecting health outran the abilities of the individual to absorb and apply it. Public health and social workers were the first to recognize the wide gap between factual knowledge and the actual application of that knowledge to daily living. Accordingly there began to appear two lines of health education activity—the one in the schools, the other in the community.[12]

There developed slowly the realization that in the educational processes in the schools lay an important part of the solution of many public health and social problems. When the family as an economic agency was modified, its educative influence diminished and the responsibility of the school increased.

Many of the health education activities now carried on within the school and the community as educational practices had their origin in the sociomedical contest with tuberculosis.

Health Education in the Schools. In 1904 there arose in

[12] H. S. Diehl, "Healthful Living," McGraw-Hill Book Company, Inc., New York, 2d ed., 1939; Lloyd Ackerman, "Health and Hygiene," Jacques Cattell Press, Lancaster, Pa., 1943.

Illinois a movement known as the Modern Health Crusade. It was designed specifically to bring about a reduction in the mortality from tuberculosis. This movement was the first recognition of the necessity for enlisting child interest as an important factor in modifying child health behavior. The Modern Health Crusade was placed on a national basis in 1915 by the National Tuberculosis Association.

These processes were soon recognized as basic hygienic measures favorable to child growth and development and therefore beneficial to all children. The underlying principles found their way into general classroom practice.[13]

In 1909 the National Society for the Study of Education published its *Year Book*, Part I of which was devoted to "Health and Education." In 1911 there was organized the Joint Committee on Health Problems in Education by the National Education Association and the American Medical Association. In 1918 the United States Office of Education published the first of its *Health Education Series*. In the same year the Commission on Reorganization of Secondary Education, in its report, gave official recognition to health as a main objective of education.

Health Education in the Community. While the modern health education program in the community may be traced to the educational leaflet against tuberculosis issued by Biggs in 1889 and to the tuberculosis exhibits in New York City and Philadelphia in 1902–1906, it was not until the organization of the National Tuberculosis Association in 1904 that a continuous and insistent community health educational campaign was launched in this country.[14]

A veritable web of organizations—official, unofficial, pro-

[13] D. B. Nyswander, "Solving School Health Problems," Commonwealth Fund, Division of Publication, New York, 1942; Louise Strachan and Elizabeth F. Jordan, "From Pioneer to Partner—Child Health Education in the National Tuberculosis Association 1917–1945," Historical Series 4, National Tuberculosis Association, New York, 1947.

[14] W. W. Bauer and Thomas G. Hull, "Health Education of the Public," W. B. Saunders Company, Philadelphia, 2d ed., 1942.

fessional, commercial, social, educational, and religious—have developed community health education programs either on a specific or general basis.[15]

Official Public Health Organization and Administration. Official public health organization now became more general and effective in the local, state, and Federal areas. The local and state health departments, especially in the largest cities and states of the country, began to recruit professional personnel in their various activities, such as administrators, vital statisticians, sanitary engineers, sanitarians, epidemiologists, laboratory directors, public health nurses, industrial hygienists, food and drug inspectors, and maternal-child hygienists.

On June 30, 1906, the Federal Food and Drug Act was passed to become effective January 1, 1907. The enforcement of the act was placed in the Department of Agriculture. The enactment of this law was the crystallization of sentiment that had grown up during the preceding period of approximately twenty years. The law was the outgrowth of the work of Dr. Harvey E. Wiley, aided by President Theodore Roosevelt. This agitation which stirred the country about its health problem marks the beginning of a long series of Federal legislative enactments for the prevention of disease and the promotion of health in this country.

Probably the greatest influence in bringing the public health problem into clear focus was the publication in 1909 of Professor Irving Fisher's "Report on National Vitality: Its Wastes and Conservation," made under the auspices of the Committee of One Hundred[16] and submitted to the National

[15] See Chaps. 15 and 16.

[16] The Committee of One Hundred was established by vote of Section I of the American Association for the Advancement of Science on June 30, 1906. In November, 1906, the Public Health Defense League was organized at the Hudson Theater, New York, as a result of a conference of delegates from 150 leading charitable, professional, philanthropic, and public welfare societies.

These two groups were organized into the American Health League in November, 1907.

Conservation Commission. Fisher declared it was both bad policy and bad economy for the state to leave protection against disease either to the weak and spasmodic efforts of charity or to the philanthropy of physicians. He advocated increased organization of public health departments along with greatly increased appropriations. His flat statement, considered radical at the time, that "fifteen years at least could be added to the average human life-time by applying the science of preventing disease" made a deep impression upon the public mind.

The Committee of One Hundred was an outgrowth of the National Conservation Conference of 1908, and its objective was to secure a National Department of Health. But Congress was indifferent to the idea and nothing happened.

However, upon the wave of interest thus created, the Congress did pass an act in 1912 to reorganize the United States Public Health and Marine Hospital Service. The name of the service became the United States Public Health Service, with greatly enlarged authority and responsibilities.

In 1915 the Census Bureau succeeded in establishing the National Birth Registration Area on the basis of the criteria for admission to the National Death Registration Area. These criteria, in brief, were a satisfactory state vital statistics law and 90 per cent completeness of reporting as shown by special applied tests.

At this point the First World War (1914–1918) intervened to turn attention from all domestic problems to military ones. And public health did not escape. However, many advances made under military necessity were later carried into peacetime activities.

On July 9, 1919, Congress passed the Chamberlain-Kahn

These bodies had for their purpose "to protect and improve the national health by advocating a National Bureau of Health, and otherwise." Their official organ was *American Health.*

William Jay Schieffelin, "Work of the Committee of One Hundred on National Health," *Annals of the Academy of Political and Social Science*, Vol. 37, No. 2, March, 1911, pp. 77–86.

Act, which created in the U.S. Public Health Service a Division of Venereal Diseases, and appropriated more than 4 million dollars for use during the two ensuing fiscal years to carry out duties imposed by the act. These duties were: (1) to study and investigate the cause, prevention, and treatment of venereal diseases; (2) to cooperate with state boards or departments of health in the prevention and control of such diseases within the states; and (3) to control and prevent the spread of these diseases in interstate traffic.

In 1920 a publication[17] by Love and Davenport, covering the medical examination of men subject to the provisions of the Selective Service Act of 1917–1918, aroused many questions about the state of the health of this country. This study showed that of every 1,000 men examined 468 were found more or less seriously defective.

Following this publication there ensued a period of health inquiry unequaled in our history both in extent and in intensity.

While these developments in public health organization were under way, there were some equally important changes taking place in the administrative work of public health. In 1905 Dr. Charles V. Chapin, superintendent of health at Providence, R.I., abandoned terminal disinfection as a measure in the control of communicable diseases and employed the practice of concurrent disinfection of morbific matter. In 1910 he published his classic "Sources and Modes of Infection,"[18] which had a fundamental influence in changing the outlook of public health workers toward communicable disease. In 1908 Chicago adopted compulsory pasteurization of milk, and the American Public Health Association published its standardized tests for milk. In 1915 the New York City Department of Health abandoned terminal disinfection, substituting concurrent disinfection as a routine practice.

[17] Albert G. Love and Charles B. Davenport, "Defects Found in Drafted Men," Government Printing Office, Washington, D.C., 1920.

[18] Charles V. Chapin, "The Sources and Modes of Infection," John Wiley & Sons, Inc., New York, 1910.

In 1914 Dr. Charles V. Chapin[19] was employed, under the direction of the Council on Health and Public Instruction of the American Medical Association, to make a survey of state health departments. This survey was the first comprehensive analysis of state health activities in this country. It was published by the American Medical Association in 1915. The rating scale employed by Dr. Chapin came in for widespread criticism at the time, but the results of the study were gradually reflected in the improvement of public health work.

Unofficial Public Health Organization. After the pattern set by the National Tuberculosis Association in 1904 in its educational attack upon tuberculosis, there gradually developed a long list of organizations created to meet specific disease problems.[20] Among some of the leading organizations were: the National Committee on Mental Hygiene (1909); American Cancer Society (1913); American Social Hygiene Association (1914); National Society for the Prevention of Blindness (1915); American Society for the Hard of Hearing (1919); and American Student Health Association (1920).

The foundations and community trusts represent another form of unofficial organization engaged in the public health movement. Among these were: Milbank Memorial Fund (1905); Russell Sage Foundation (1907); Rockefeller Foundation (1913); Rosenwald Fund (1917); and Commonwealth Fund (1918). These organizations carried on direct activities, encouraged other organizations through subsidies, and engaged in health education through research and publications.

American Medical Association and Health Insurance. The interest of the American Medical Association in health insurance began with the creation in 1916 of the Special Com-

[19] Charles V. Chapin, "A Report on State Public Health Work Based on a Survey of State Boards of Health," American Medical Association, Chicago, Ill., 1915 (out of print).

[20] For detailed account see Chap. 15.

mittee on Health Insurance.[21] It was the duty of this committee to compile information and to study the role of the physician in health insurance. In 1920 the American Medical Association made the first official declaration of its opposition to any scheme embodying compulsory health insurance "controlled or regulated by any state or by Federal Government."[22]

International Health. No important international health agency was established until the beginning of the twentieth century. First came the Pan-American Sanitary Bureau,[23] created in 1902 and located in Washington, D.C. It was the outgrowth of the First International Sanitary Conference of American Republics, held in Washington, D.C., in 1902. This conference was notable for its decision to base quarantine measures against yellow fever on Carlos Finlay's theory that the disease is conveyed only by the bite of an infected mosquito.

Some of the duties of the Bureau were: (1) to prevent the introduction of infectious diseases into the American republics and from one republic to another; (2) to restrict quarantine measures to the minimum compatible with the prevention of disease; (3) to collect and distribute epidemiological intelligence; (4) to act as a consulting bureau for the American health authorities; (5) to improve national health administration; and (6) to provide liaison between the national health services.

The Bureau was the executive organ of the Pan-American Sanitary Conferences; it publishes the *Boletín de la oficina sanitaria panamericana.*

At a meeting of the International Sanitary Conference in

[21] *Bulletin of the American Medical Association*, Vol. 2, May 15, 1916, pp. 356–366.

[22] *Journal of the American Medical Association*, Vol. 74, May 8, 1920, p. 1319.

[23] Frank G. Boudreau, "International Health Organization," in Haven Emerson, "Administrative Medicine," Thomas Nelson & Sons, New York, 1941, pp. 231–247.

Rome in 1907 agreement was reached providing for the creation of the International Public Health Bureau, officially known as the "Office international d'hygiène publique," which was set up in Paris in 1909. This office became permanent in 1923. The Office is an official body, and its work is directed by the Permanent Committee which meets twice yearly. It appoints the director and his small staff, all of French nationality. French is the official language used. It publishes *The Weekly Epidemiological Report* and a monthly bulletin "*Bulletin mensuel de l'office international d'hygiène publique.*"

Following the close of the First World War (1914–1918), the Treaty of Versailles (Part VIII) set up two organizations to deal with health under the League of Nations. First, the Industrial Health Service was established as an integral part of the International Labor Organization, which in 1919 adopted a draft convention relating to protection of maternity, providing for six weeks' leave with benefits before and after childbirth. Second, there was organized in 1919 an Epidemic Commission and the Provisional Health Committee, which later became the Health Organization of the League of Nations. This organization has published the *Annual Epidemiological Report* since 1923; and it has carried out a program of interchange of public health personnel, assistance to governments in sanitary reorganization (Greece, 1928; China, 1929), campaigns against particular diseases (malaria, syphilis), and a campaign for better nutrition.

Summary

Throughout this era of hygiene the emphasis was placed more and more upon the *control of individual health through education.* The idea of prevention of disease became the dominant one. The role of the public health nurse assumed an important place in the public health program, both unofficial and official. The contributions of men like Doctors Trudeau, Biggs, Flick, and Chapin gave a new orientation to the public health movement. There began to appear a belief

not only in the possibilities of disease control, but also in the positive idea of health promotion. Success in antituberculosis work by the unofficial National Tuberculosis Association, as gauged by the steady decline in the death rate from 194.4 per 100,000 of the population in 1900 to 113.1 in 1920, gave analogous support to the rapidly multiplying unofficial health organizations that came into being during this era. The sphere of action moved into the state with an awakening of the national government.

Suggested Reading

Rosenau, Milton J., "Preventive Medicine and Hygiene," Appleton-Century-Crofts, Inc., New York, 1st ed., 1913; 6th ed., 1935.

Moore, Harry H., "Public Health in the United States," Harper & Brothers, New York, 1923.

Sedgwick, William T., "Principles of Sanitary Science and the Public Health," The Macmillan Company, New York, 1925.

Hiscock, Ira V. (ed.), "Community Health Organization," American Public Health Association, New York, 1st ed., 1927; Commonwealth Fund, Division of Publication, New York, 2d ed., 1932; 3d ed., 1939.

Smiley, Dean F., and Adrian G. Gould, "Community Hygiene," The Macmillan Company, New York, 1st ed., 1929; 2d ed., 1935; 3d ed., 1941.

Winslow, C.-E. A., "The Road to Health," The Macmillan Company, New York, 1929.

A Symposium, "Past and Present Trends in the Tuberculosis Movement," Historical Series 1, National Tuberculosis Association, 1942.

CHAPTER 13

ERA OF SOCIAL MEDICINE, 1920–1934

With the end of the First World War the idea of *prevention* grew into an intensive and extensive process of *community health education.* Participation in the public health movement was evidenced by innumerable organizations, both old and new.[1] These organizations represented practically every phase of community life. Professional associations such as the American Public Health Association, the American Medical Association, the National Organization of Public Health Nursing, the American Physical Education Association, which later became the American Association for Health, Physical Education and Recreation, and the National Education Association of the United States—to name only a few—began to reexamine their programs in the light of the revelations elicited by the conduct of the war. Promotional agencies such as the American Social Hygiene Association, the American Society for the Control of Cancer, the National Committee for Mental Hygiene, and the National Tuberculosis Association redoubled their efforts to create a health consciousness throughout the country.

In addition to these health associations directly interested in some phase of the public health problem there was a marked increase in the growth and interest of health foundations and community trusts, commercial organizations (particularly insurance companies), councils and conferences, and various others (social, religious, fraternal, farm, trade, and

[1] Social Work Year Book," Russell Sage Foundation, New York, No. 1, 1929, to No. 9, 1947, issued biennially except in 1931.

labor). Health became a predominant concern throughout the land.

Bacteriology and Immunology. The rapid pace of discovery in bacteriology and immunology that prevailed since 1877 now began to slow down. In 1921 Kahn introduced the serum test for syphilis. In 1923 George and Gladys Dick discovered the hemolytic streptococcus of scarlatina and devised a susceptibility test for scarlatina. In 1924 Calmette vaccinated children against tuberculosis with B.C.G. (bacillus Calmette-Geurin), a nonvirulent culture. In 1927 Ruth Tunnicliff introduced a serum against measles. In 1928 Noguchi discovered the pathogen of trachoma. In 1929 Fleming discovered penicillin. In 1934 Theobald Smith formulated the unifying concept of infectious disease as a manifestation of parasitism. The medical explanation of an infectious disease in man broadened to become a biologic one.

Joint Committee on Health Problems in Education. A cooperating committee representing the National Education Association and the American Medical Association was created in 1921. It grew out of an earlier cooperative effort by the National Council on Education and the American Medical Association in 1911. The committee was known as the Joint Committee on Health Problems in Education. It gave constructive service "in proposing optimum essentials, in clarifying health procedures, in conducting special studies, preparing reports, and disseminating knowledge for conserving and improving the health of school children and teachers."

The Joint Committee on Health Problems in Education published in 1924 a report entitled "Health Education–A Guide for Teachers and a Text for Teacher Education."[2] This volume had enormous influence in establishing health education in the school system. It became the compass and guide to teachers everywhere.

[2] 1st ed., 1924; 1st rev., 1930; 2d rev., 1941; 3d rev.; completely rewritten, 1948. National Education Association of the United States, Washington, D.C.

Sheppard-Towner Act. Increased interest in health exhibited itself, particularly in the health of the child. In 1921 Congress passed an act for the promotion of the welfare and hygiene of maternity and infancy known as the Sheppard-Towner Act. An annual appropriation of $1,240,000 was authorized for five years. This sum, except for $50,000 earmarked for the Children's Bureau for administration of the act, was to be divided among the states accepting the provisions of the act through their legislative authority. An act of 1927 extended the authorized appropriation for two years, and provided that after June 30, 1929, the original act should be "of no force and effect." At the expiration of the act, forty-five states and Hawaii were cooperating under it.

Physical Education in State Departments of Education. Immediately after the First World War, a nationwide movement to improve the physical character of the population in the United States was inaugurated by the National Physical Education Service, of Washington, D.C. The objectives were to secure legislation to provide for state promotion of physical education in state departments of education. A few states had provided such laws—North Dakota (1899), Ohio (1904), and nine others. But only four states had state supervisors of physical education. Beginning with the year 1919 there was a rapid increase in the number of state enactments and in the number of state supervisors of physical education employed. This development has now become one of the accepted phases of the educational program in most of the states.[3]

National Health Council. On January 1, 1921, the National Health Council was organized. It was incorporated in 1932. It was composed of sixteen national unofficial health agencies as active members, two Federal agencies as advisory members, and four national unofficial agencies as associate

[3] Jesse F. Williams and Clifford L. Brownell, "The Administration of Health and Physical Education," W. B. Saunders Company, Philadelphia, 3d ed., 1945.

members. Its purposes were to coordinate and correlate the activities of its member organizations, to carry on joint projects in public health, and to provide a service department for carrying on office and field activities. The council has maintained the National Health Library since 1921. It publishes "Health Articles of the Week," an index of literature on public health. The National Health Series, consisting of twenty volumes, has been prepared under the auspices of the council. The council also serves as the Health Division of the National Social Welfare Assembly.

Hagerstown, Md., Survey. In 1921 the U.S. Public Health Service began a series of studies upon the incidence of illness in a general population group in Hagerstown, Md.[4] These studies continued for about 2½ years. A record of illness according to cause was secured for a population of between 8,000 and 9,000 persons. These studies showed that the lower the economic status, the higher the incidence of sickness and mortality.

Health Survey of Eighty-six Cities. Growth in the health activities of municipal health departments led to the need to determine the status of health-department practices and the degree of adequacy of health services. A survey of municipal health departments was conducted between 1920 and 1924 through the joint efforts of the American Child Health Association, the American Public Health Association, and the U.S. Public Health Service. The cities selected were those with populations in 1920 of from 40,000 to 70,000. The results were published by the American Child Health Association[5] in 1925 and revealed the uneven character of health-department services and practices.[6]

[4] Edgar Sydenstricker, "The Incidence of Illness in a General Population Group," *Public Health Reports*, Vol. 40, Feb. 13, 1925, p. 279.

[5] American Child Health Association, "A Health Survey of 86 Cities," Research Division, New York, 1925.

[6] American Child Health Association, "Development and Use of Appraisal Form for City Health Work," New York, 1925.

Health Activities Appraisal Form. An outgrowth of the surveys made by the American Child Health Association and the American Public Health Association were the "appraisal forms" by which the health activities of a community might be rated on a quantitative basis. The use of the appraisal form in scoring the results of health departments turned attention to self-appraisal and to the evaluation of the result of health work. The ultimate aim of health appraisals is to improve the quality and adequacy of public health work.

In March, 1925, a trial issue of "An Appraisal Form for City Health Work" was issued by the Committee on Administrative Practice of the American Public Health Association. In 1927 an "Appraisal Form for Rural Health Work" was issued by the Committee on Administrative Practice.[7]

Committee on Costs of Medical Care. In an effort to find a remedy for the rapidly and steadily rising costs of medical care, there was organized in 1927 a National Committee on the Costs of Medical Care. The committee consisted of fifty members drawn from various interested groups, ranging from private medical practitioners to economists. An intensive study into every phase of the national health situation was conducted over a period of five years. Dr. Harry H. Moore was director of the committee. The main financial support for the study came from eight large foundations. An extensive series of publications were developed, and the final report was contained in a volume entitled "Medical Care for the American People,[8] published in 1932. A majority report

[7] In July, 1938, the appraisal form appeared as a combined form of city and rural work. Detailed appraisal forms have been constructed for school health work, for tuberculosis, and for industrial hygiene.

American Public Health Association, "Fifteen Years of the Committee on Administrative Practice," *American Journal of Public Health*, Vol. 25, 1935, pp. 1296–1302; "A Twenty-five Year Review of the Work of the Committee on Administrative Practice," *American Journal of Public Health*, Vol. 35, 1945, pp. 1253–1259.

[8] "Medical Care for the American People," Final Report of the Committee on the Costs of Medical Care, adopted October 31, 1932, University of Chicago Press, Chicago, 1932.

was presented, along with two minority reports and two individual statements.

The majority report recommended a general plan for medical service which represented a compromise between individual practice and state control. It approved extension of public health services and recommended that medical services should be furnished by groups of physicians, dentists, and nurses organized around hospital centers. Medical costs were to be met through voluntary group insurance, or taxation, or both.

The first minority report (designated as number one) was made by nine physicians representing private practice and two physicians representing institutions and special interests on the committee. This report recommended that the governmental competition in the practice of medicine be discontinued; that government care of the indigent be expanded; that united attempts be made to restore the private practitioner to the central place in medical practice; that the corporate practice of medicine be opposed; and that state and county medical society plans for medical care through private practice be developed.

The second minority report (designated as number two) was made by two dentists representing private practice on the committee. This report contended that the majority report was unduly critical of the professions and thus produced bias in some of the statements made; that the description of the community medical center in the majority report was Utopian in concept; that the problem of providing medical care was a question of low incomes and that the solution depended at least as much upon increasing incomes to a satisfactory standard of living as upon methods of organizing medical care; and that the medical society plan of sickness insurance should be endorsed.

The two individual statements were made because, in the opinion of the writers, the majority report fell far short of an adequate attack upon the problem of medical care and because the recommendations did not deal adequately with the funda-

mental economic question which the committee was formed primarily to study and consider.

Findings of the committee were the subject of an enormous flood of discussion—pro and con—in the daily press and in current popular and professional journals.

White House Conference. The third Conference on Child Health and Protection was called by President Herbert Hoover in 1930. More than thirty volumes of reports were issued by the conference.[9] This conference adopted a "Children's Charter."[10] It gave a tremendous impetus to nationwide interest in the needs of children.

Federal Emergency Relief Administration. When the local and state governments were no longer able to carry the relief load caused by the depression, the Federal government organized the Federal Emergency Relief Administration (FERA) in May, 1933, to assist the states by grants-in-aid in maintaining their unemployment relief programs. In June, 1933, the program was expanded to provide medical attendance and medical supplies to recipients of unemployment relief. In August, 1933, there was issued the unprecedented Federal Rules and Regulations No. 7, which amplified and defined policies and procedures under which medical care might be given to relief recipients.

This program did much to create a new awareness of health needs, and the wide participation of citizens in the program did much to educate communities to their responsibilities.[11]

National Resources Board. Since one of the immediate problems posed by the depression of 1933 was the centralization of information relative to conditions throughout the

[9] "White House Conference, 1930," Addresses and Abstracts of Committee Reports, Appleton-Century-Crofts, Inc., New York, 1931.

[10] *Ibid.*, pp. 45–48.

[11] Josephine C. Brown, "Public Relief, 1929–1939," Henry Holt and Company, Inc., New York, 1940.

country, President Franklin D. Roosevelt set up in 1933, by Executive Order, the National Resources Board (NRB). In 1933 a two-volume report of the President's Research Committee on Social Trends[12] was made, in which the health situation of the country was reviewed in all its aspects. In 1935 the name was changed to the National Resources Committee.

Hospital-care Insurance. The American Hospital Association, through its council and board of trustees, decided in 1933 to make a special study of the trends toward hospital-care insurance in the United States and abroad with a view to recommending certain standards which should characterize the procedure, if it were to develop, throughout the United States. In June, 1934, the Board of Regents of the American College of Surgeons approved the general principle of insurance for sickness costs, and at the annual meeting of the college in Boston in October, 1934, the membership endorsed the principle of group budgeting as applied to group care.

American Medical Association on Medical Care. At the annual meeting of the American Medical Association in 1934 the House of Delegates adopted ten principles[13] to assist local medical societies in undertaking experiments in medical care. These principles were:

1. All features of medical service in any method of medical practice should be under the control of the medical profession. No other body or individual is legally or educationally equipped to exercise such control.
2. No third party must be permitted to come between the patient and his physician in any medical relation. All responsibility for the character of medical service must be borne by the profession.

[12] "Recent Social Trends in the United States," Report of the President's Research Committee on Social Trends, McGraw-Hill Book Company, Inc., New York, 1933.

[13] Proceedings of the House of Delegates, American Medical Association, Chicago, 1934, p. 55.

3. Patients must have absolute freedom to choose a legally qualified doctor of medicine who will serve them among all those qualified to practice and who are willing to give service.

4. The method of giving the service must retain a permanent confidential relation between the patient and a "family physician." This relation must be the fundamental and dominating feature of any system.

5. All medical phases of all institutions involved in the medical service should be under professional control, it being understood that hospital service and medical service should be considered separately. These institutions are but expansions of the equipment of the physician. He is the only one whom the laws of all nations recognize as competent to use them in the delivery of service. The medical profession alone can determine the adequacy and character of such institutions. Their value depends on their operation according to medical standards.

6. In whatever way the cost of medical service may be distributed, it should be paid for by the patient in accordance with his income status and in a manner that is mutually satisfactory.

7. Medical service must have no connections with cash benefits.

8. Any form of medical service should include within its scope all legally qualified doctors of medicine of the locality covered by its operation who wish to give service under the conditions established.

9. Systems for the relief of low-income classes should be limited strictly to those below the "comfort level" standard of income.

10. There should be no restrictions on treatment or prescribing not formulated and enforced by the organized medical profession.

Committee on Economic Security. On June 8, 1934, President Franklin D. Roosevelt, in a message to Congress, announced a program of social security legislation to protect

against misfortunes which could not be wholly eliminated in this man-made world. He appointed a Committee on Economic Security,[14] composed of cabinet members and a technical staff to prepare the program. This body had the services of a medical advisory board, which included representatives of the American Medical Association. No recommendations were made by the committee regarding sickness insurance, although the principles of health insurance desired by the cabinet members were communicated to the President.

The deliberations of this and other groups brought forth a plan which ultimately took shape in two major enactments in 1935—the Federal Emergency Relief Act and the Social Security Act. The one was to meet the immediate problems brought on by the depression, and the other was to establish a long-term program looking toward the solution of some of the problems revealed by the emergency.

Summary

Throughout this era the emphasis was upon the control of individual health through *community action*. There are discernible two dominant ideas: (1) the protection of the health of the individual by personal hygiene; and (2) the prevention of disease through the activities of unofficial groups and through the activities of official agencies. It was a period of fact finding in which the accumulated evidence pointed to a wide gap between knowledge and its application. Health education expanded to envisage prevention of disease, promotion of health, the administration of health agencies, medical care, and discussion of ways to meet the health problems of the individual and of the community. The health educator now began to assume an important role in the health movement. The sphere of action moved from the state to the national area.

[14] Committee on Economic Security, Report to the President, Government Printing Office, Washington, D.C., 1935.

Suggested Reading

"Health Education—A Program for Public Schools and Teacher Training Institutions," National Education Association, Washington, D.C., 1924.

"Medical Care for the American People," Final Report of the Committee on the Costs of Medical Care, University of Chicago Press, Chicago, 1932.

"Recent Social Trends in the United States," Report of the President's Research Committee on Social Trends, McGraw-Hill Book Company, Inc., New York, 1933.

Smith, Theobald, "Parasitism and Disease," Princeton University Press, Princeton, N.J., 1934.

CHAPTER 14

ERA OF SOCIAL INSURANCE, 1935—1948

The period of fact finding in the era of social medicine relating to health problems in education, incidence of illness in local areas, the nationwide study of the costs of medical care, the expansion of Federal relief programs to include medical service and medical supplies, and a Federal program of social security focused attention upon the problems of disease and health on a national plane.

Never before in the history of the United States was the searchlight so definitely trained upon the problems of poverty and disease. The Federal government now began officially to make inquiries into the problems. The Congress was deluged with numerous programs for the solution of these problems.

These programs embraced: (1) comprehensive compulsory health insurance; (2) increased appropriations in the areas of medicine and public health for education, training of personnel, operation of health services—Federal, state, and local; and (3) expanded research in these areas.

Growing out of these inquiries and legislative proposals came the National Health Program proposed by President Harry S. Truman. The processes of community health education throughout the nation were gaining momentum. What the ultimate outcome will be cannot be written at this time. It also becomes difficult to appraise the various crosscurrents at work and to evaluate their importance. Presentation of the more important events is therefore made in a chronological sequence.

Bacteriology, Immunology, and Chemotherapy. In 1935 the sulfa drugs were developed by Gerhard Domagk and found useful against a whole series of pathogenic bacteria, especially against the vicious "cocci" group. In 1940 Chain and Florey purified and tested penicillin, discovered by Fleming in an antibiotic effective against practically all gram-positive organisms. In 1944 Schatz, Bugie, and Waksman discovered streptomycin, an effective antibiotic against most of the important gram-negative organisms.[1]

Farm Security Administration. The first medical program arising out of the depression was that of rural medical care, initiated by the Farm Security Administration (FSA), which was created by Executive Order of April 30, 1935, in the Department of Agriculture.[2] It was designed to meet the problems of low-income farmers. *This program was the only one of its kind in which a Federal agency worked directly with local county units without first operating through the respective state governments.* Soon after its organization the Farm Security Administration found that subsidies to low-income farmers in the form of loans were defaulted in unreasonably large numbers. After study it was found that high sickness rate and low health status of the submarginal farmers were a very important factor in lowering their productivity, so the FSA began the establishment of medical programs to improve the health status of farmers. These programs were based upon a central insurance fund to which each farm family contributed a specified amount of money.

Social Security Act. In 1935 Congress for the first time took advantage of the authority granted by Paragraph 26, Section 8, Article 1, of the United States Constitution to per-

[1] H. J. Parish, "Bacterial and Virus Diseases," The Williams & Wilkins Company, Baltimore, 1948. In Chap. XVI there is a good historical summary of the modern development of serum therapy and prophylaxis by active immunization.

[2] Joseph Gaer, "Toward Farm Security," Farm Security Administration, Government Printing Office, Washington, D.C., 1941.

mit a more constructive public health program that would be national in its application. This measure was known as the Social Security Act[3] and became effective August 14, 1935. The act marked the assumption by the Federal government of leadership and a continuing responsibility in an area that had been considered hitherto as belonging to the state and local subdivisions. This responsibility has been declared by the United States Supreme Court to be consistent with the intent of the general welfare clause of the Constitution.[4]

The act provided for the establishment of two social insurance systems. One of these, unemployment insurance or compensation, is now in effect in all the states and territories. The other was set up as a system of old-age insurance, and as a result of amendments made in 1939 it now includes survivor's insurance as well. The act also extended to the states, and to municipalities through the states, financial aid on a scale never dreamed of previously. Among other items it provided for grants to state health departments for crippled children's services, maternal and child health services, and certain other health services and to state departments of education for an expansion of vocational rehabilitation.

National Health Inventory. A national health inventory was conducted by the Works Progress Administration (WPA) in 1935–1936. It was financed with a $3,500,000 allotment of Federal funds. It covered a house-to-house canvass of 800,000 families in 84 cities and 23 rural areas in 18 states. A study was also made of the relief population, which was found to be about 16 per cent of the total inhabitants. Reports of the National Health Inventory, known as the National Health Survey,[5] were made to the Interdepart-

[3] Compilation of the Social Security Laws, including the Social Security Act, as amended and Related Enactments through March 1, 1947, Federal Security Agency, Washington, D.C., 1947.

[4] *In re* Helverding v. Davis 301 U.S. 619 (1937).

[5] Perrott, Tibbitts, and Britten, "The National Health Survey," *Public Health Reports*, Vol. 54, Sept. 15, 1939, p. 1663.

mental Committee to Coordinate Health and Welfare Activities.

A technical committee made up of physicians and statisticians from the U.S. Public Health Service, the Social Security Board, and the Department of Labor interpreted the findings of the inventory and submitted the following:

1. This country loses 10 billion dollars annually through illness and premature death.

2. Each year 70 million sick persons lose over 1 billion days from work.

3. Stillborn infants number 75,000 every year, 69,000 infants die before they are a month old, and more than 12,500 women succumb to causes connected with pregnancy and childbirth.

4. During the same twelve-month period, 517,000 persons begin syphilis treatment, twice that number start to obtain medical care for gonorrhea, 100,000 die of pneumonia, and 150,000 are being admitted to institutions for mental disease.

5. Disabling illness in the relief population occurs at a rate of 68 per cent higher than among those families with an annual income of $3,000 or more. The unemployed have twice as much disabling illness as the employed, and WPA workers have a disabling illness rate 40 per cent more than that of any other groups of employed persons.

This was the most extensive sickness survey ever undertaken in the United States.

Federal Interdepartmental Committee. As a result of the National Health Inventory, President Franklin D. Roosevelt appointed an Interdepartmental Committee on August 15, 1935, to coordinate health and welfare activities. This action followed the passage of the Social Security Act. The purpose of the committee was to hasten the time that the full benefits of the varied Federal programs under the act's provision would reach, with minimum delay and maximum effectiveness, the individuals for whose benefits the program

was brought into existence. The membership of the committee came from the Social Security Board, departments of Interior, Labor, and Agriculture, the U.S. Public Health Service, and the WPA. The committee was reestablished on October 27, 1936, by Executive Order.

In 1937 the Interdepartmental Committee charged the Technical Committee on Medical Care to survey the health and medical services of the United States government. This technical committee[6] arrived at two broad facts.

1. Existing services for the conservation of national health are inadequate to secure to the citizens of the United States such health of body and mind as they should have.
2. Nothing less than a national comprehensive health program can lay the basis for action adequate to the nation's need.

It was under this committee that the National Health Conference was called in July, 1938. The committee ceased to function in 1939.

Blue Cross Hospital Service. A study by the National Bureau of Economic Research, made in cooperation with the Committee on Costs of Medical Care, reported that in 1932 some 2 million persons secured part or all of their medical care through membership in voluntary insurance plans. Most of these plans were in such industries as mining, railroads, and lumbering.

"Group hospitalization," so called, was approved in principle by the American Hospital Association early in 1933, and subsequently, in October, 1934, by the American College of Surgeons. From some 6,000 members in five plans in 1933, growth has been phenomenal, until at present about 25 per cent of the population carry some form of voluntary health insurance, the majority being insured only against hospital bills or wage loss during sickness.

[6] Report of the Technical Committee on Medical Care, "The Need for a National Health Program," Interdepartmental Committee to Coordinate Health and Welfare Activities, Washington, D.C., 1938.

The Blue Cross Hospital Service[7] was organized in 1935, and has grown until it now enrolls about 28 million people. These plans cover the major portion of hospital bills of a semiprivate patient during ordinary illness, at a cost of about $30 per year per family. The plans do not cover doctors' bills, which ordinarily take about 40 cents of the medical dollar—three times as much as hospitalization—nor do they include preventive medicine, nursing, drugs, or dental care. The Blue Cross plans now serve forty-three states and the District of Columbia and continue to expand.

Blue Shield Medical Services. While the hospital insurance plans were expanding, the state medical societies began to develop state-wide voluntary prepayment medical-care plans. These are known as the Blue Shield Medical Services. The first of these services to be put in operation was the California Physicians Service which was established in February, 1939. In 1942 the American Medical Association passed a resolution approving the principle of medical-service plans. By June 30, 1948, the "Seal of Acceptance" set up by the American Medical Association had been granted to sixty-six prepayment medical-care plans.[8]

National Conference on Venereal Disease Control. A National Conference on Venereal Disease Control[9] was held in December, 1936. It recommended a nationwide attack on

[7] Louis H. Pink, "The Story of the Blue Cross," *Public Affairs Pamphlet* 101, New York, 1945; Franz Goldmann, "Voluntary Medical Care Insurance in the United States," Columbia University Press, New York, 1948.

[8] Louis S. Reed, "Blue Cross and Medical Service Plans," U.S. Public Health Service, Federal Security Agency, Washington, D.C., October, 1947.

"Voluntary Prepayment Medical Care Plans," American Medical Association, Chicago, rev. ed., 1948.

[9] Proceedings of Conference on Venereal Disease Control Work, Supp. 3 to "Venereal Disease Information," U.S. Public Health Service, Washington, D.C., 1937.

syphilis and gonorrhea and a Federal appropriation of 25 million dollars for that purpose. At meetings in 1937 and 1938 the Conference of State and Provincial Health Authorities recommended legislation for this purpose. As a result of the widespread interest in the subject, Congress passed the Venereal Disease Control Act approved by the President on May 24, 1938.

This act authorized the U.S. Public Health Service to conduct research, demonstrations, and education for the control of venereal diseases and to make grants to the states for this purpose, apportioned among the several states on the basis of population, extent of the venereal disease problem, and financial needs. An appropriation of 3 million dollars was made for the first fiscal year and authorization given for an appropriation of 5 million dollars the second year and 7 million dollars the third year, and for each of the ten fiscal years thereafter "such amounts as Congress may determine to be necessary to carry out the purposes of the act."

National Cancer Institute. On August 5, 1937, Congress passed an act for the establishment of the National Cancer Institute under the U.S. Public Health Service. It had for its purpose:

1. To conduct, assist, and foster research investigations and studies relating to the cause, prevention, and methods of diagnosis and treatment of cancer.
2. To promote coordination of researches conducted by the institute and similar researches conducted elsewhere.
3. To procure, use, and lend radium.
4. To provide training and instruction in technical matters relating to the diagnosis and treatment of cancer.
5. To provide research fellowships in the institute from funds appropriated or donated for such purpose.
6. To secure for the institute consultation services and advice of cancer experts from the United States and abroad.
7. To cooperate with state health agencies in the prevention and control of cancer.

A National Advisory Cancer Council was organized, consisting of six members selected from the leading medical or scientific authorities who are outstanding in the study, diagnosis, or treatment of cancer, to recommend policies concerning grants-in-aid. The council is appointed by the Surgeon General, who serves as ex-officio chairman.[10]

Commission on Hospital Service. In January, 1937 the American Hospital Association, assisted through a grant from a foundation, established the Commission on Hospital Service with a full-time director with offices at the headquarters of the association. The functions of the commission are: (1) to provide information and service to hospitals or communities contemplating the establishment of voluntary hospital-care insurance plans; (2) to serve as a clearinghouse of information for the executives of existing hospital service associations; and (3) to study other related problems of hospital administration and finance.

American Medical Association Principles on Hospital Insurance. Group hospital insurance grew at such a rapid pace that in 1937 the House of Delegates of the American Medical Association[11] deemed it necessary to adopt ten principles to safeguard the quality of medical service under hospital insurance. These principles, in brief, are as follows:

1. The plan of organization shall conform to state statutes and case law.
2. The plan shall include all reputable hospitals.
3. The medical profession shall have a voice in the organization and administration of the plan.
4. The subscriber's contract shall exclude all medical services—contract provisions shall be limited to include hospital-room accommodations such as bed, board, operating room, medicines, surgical dressings, and general nursing care; only

[10] "The National Cancer Institute," *American Journal of Public Health*, Vol. 27, December, 1937, pp. 1288–1289.

[11] Proceedings of the House of Delegates, American Medical Association, Chicago, 1937, pp. 22 and 27.

then will the distinction between hospital service and medical service be clear.

5. The plan shall be operated on an insurance accounting basis, with due consideration given to earned and unearned premiums for contingencies and unanticipated losses.

6. There shall be an upper income limit for subscribers.

7. There shall be no commercial or high-pressure salesmanship or exorbitant or misleading advertising to secure subscribers.

8. There shall be no diversion of funds to individuals or corporations seeking to secure subscribers for a profit.

9. Group hospitalization plans shall not be utilized primarily or chiefly as a means to increase bed occupancy or to liquidate hospital indebtedness.

10. Group hospitalization plans shall not be considered a panacea for the economic ills of hospitals.

National Foundation for Infantile Paralysis. The organization of the National Foundation for Infantile Paralysis was sponsored by President Roosevelt on September 23, 1937, and it was organized on January 3, 1938. Its purpose is to lead, direct, and unify the fight against infantile paralysis, to give financial support to scientific research and to the education of the profession and laity in the latest advances made against the disease, and to direct aid to afflicted persons through county chapters of the national foundation.[12]

National Health Conference. A National Health Conference[13] was called at Washington, D.C., in July, 1938, by the Interdepartmental Committee to Coordinate Health and Wel-

[12] Basil O'Connor, "The National Foundation for Infantile Paralysis, Inc., General Statement of Plans and Appointment of Committees," New York, June 21, 1938.

[13] Proceedings of the National Health Conferences, July 18–20, 1938, Washington, D.C.: 76th Cong. 1st Sess., House Doc. No. 120, "Message from the President of the United States Transmitting the Report and Recommendations on National Health," Jan. 23, 1939.

fare Activities. It was called to discuss the report of the Technical Committee on Medical Care entitled the "Need for a National Health Program" and the findings of the National Health Inventory. The conference was attended by members of the medical and related professions, by public health and public welfare officials, by workers in health and social agencies, by representatives of labor and farm groups, and by other groups composing the general public.

The National Health Program had recommended: (1) expansion of public health and maternal and child health services; (2) expansion of hospital facilities; (3) expansion of medical-care services for the medical needy; (4) a general program of medical care; and (5) insurance against loss of wages during sickness.

The National Health Conference covered these recommendations in its discussions but no formal recommendations were made.

American Medical Association Action on National Health Conference. Shortly after the conclusion of the National Health Conference, the American Medical Association[14] called its House of Delegates into special session to act on the proposals of the conference. The report of the Reference Committee of the House of Delegates took up the recommendations of the conference seriatum.

1. Under the Recommendation I on Expansion of Public Health Service: (1) Your committee recommends the establishment of a federal department of health with a secretary who shall be a Doctor of Medicine and a member of the President's Cabinet; (2) The general principles outlined by the technical committee for the expansion of public health and maternal and child hygiene services are approved and the American Medical Association definitely seeks to cooperate in developing efficient and economical ways and means of putting into effect this recommendation:

[14] Louis Hopewell Bauer, "Private Enterprise or Government in Medicine," Charles C Thomas, Publisher, Springfield, Ill., 1948; Proceedings of the House of Delegates, American Medical Association, Chicago, 1938 (special session).

(3) Any expenditure made for the expansion of public health and maternal and child health services should not include the treatment of disease, except so far as this cannot be successfully accomplished through the private practitioner.

2. Under Recommendation II on Expansion of Hospital Facilities: Your committee favors the expansion of general hospital facilities where need exists: The hospital situation would indicate that there is at present greater need for the use of existing hospital facilities than for additional hospitals. . . .

3. Under Recommendation III on Medical Care for the Medically Needy: Your committee advocates recognition of the principle that the complete medical care of the indigent is a responsibility of the community, medical and allied professions and that such care should be organized by local governmental units and supported by tax funds. . . .

4. Under Recommendation IV on a General Program of Medical Care: Your committee approves the principle of hospital service insurance which is being widely adopted throughout the country. . . .

In addition to insurance for hospitalization, your committee believes it is practicable to develop cash indemnity insurance plans to cover, in whole or in part, the costs of emergency or prolonged illness. . . .

Your committee is not willing to foster any system of compulsory health insurance. . . .

Your committee recognizes the soundness of the principles of workmen's compensation laws and recommends the expansion of such legislation to provide for meeting the costs of illness sustained as a result of employment in industry.

Wagner Health Insurance Bill. On February 28, 1939, Senator Robert F. Wagner of New York introduced in the Senate the first bill (S. 1620) providing for a system of Federal compulsory health insurance.[15] The bill was intended to

[15] Nathan Sinai, Odin W. Anderson, and Melvin L. Dollar, "Health Insurance in the United States," Commonwealth Fund, Division of Publication, New York, 1946.

Elizabeth W. Wilson, "Compulsory Health Insurance," National Industrial Conference Board, Inc., New York, 1947.

make effective the national health program recommended by the Interdepartmental Committee to Coordinate Health and Welfare Activities. This was to be under the direction of the U.S. Public Health Service, and the insurance features were to be integrated with the Federal Social Security program. The bill did not pass.

Other bills were introduced as follows: in 1941 (S. 429, Capper); in 1942 (H. R. 7354, Eliot); in 1943 (S. 1161, Wagner-Murray-Dingell); in 1945 (S. 1050, Wagner-Murray-Dingell, and S. 1318, Pepper); in 1946 (S. 2143, Taft-Smith-Ball), reintroduced in 1947 (S. 545, S. 1320, Wagner-Murray-Pepper, and H. R. 3548, Dingell).

Other bills touching on the health situation, either relating to medical care or insurance were: the Taft-Smith and Ball bill (S. 2143), 1946; the Fulbright-Taft bill (S. 140), 1947, to establish a Department of Health, Education and Security; and the Taft-Smith-Ball-Donnelly bill (S. 545), 1947, known as the National Health Act of 1947, to be administered by a national health administrator, and frankly intended to replace the Wagner-Murray-Dingell bill. This was considered in 1948 but no action was taken.

White House Conference. The Conference on Children in a Democracy[16] was called by President Franklin D. Roosevelt in January, 1940. It held its final sessions while war was breaking over Europe. The membership of the conference totaled nearly 700 persons. In this conference equal weight was given to problems of health, education, and social services for children. The deliberations of the conference made evident the interdependence of economic, health, educational, social, and other factors in meeting the needs of the whole child.

Council of National Defense. On November 28, 1940, the Council of National Defense set up the Office of the Coordina-

[16] U.S. Children's Bureau, "Children in a Democracy," Final Report, *Publication* 272, 1942.

tor of Health, Welfare, and Related Defense Activities to coordinate all health, medical, welfare, nutrition, recreation, and other related fields of activity affecting the national defense, including those aspects of education under the Federal Security Agency.

By Executive Order of September 3, 1941, the Office of Defense, Health, and Welfare Services was established to supersede the Office of the Coordinator of Health, Welfare, and Related Activities. This office was abolished by Executive Order on April 29, 1943, and the functions, duties, powers, personnel, property, records, and funds were transferred to the Federal Security Agency.[17]

New York Academy of Medicine Committee. A Committee on Medicine and the Changing Order was established by the Council of the New York Academy of Medicine in 1942 and began its work in February, 1943. This action was taken with the conviction that the medical profession was confronted by problems which required thorough study and that the Academy had both the opportunity and the responsibility to contribute to the effective solution of these problems.

The committee, composed of physicians, representatives of the allied professions of dentistry and nursing, and laymen, was aware of the need for systematic and objective data relative to the many aspects of medical education, medical research, and medical service. To that end the committee enlisted the cooperation of a number of experts in the composition of a series of monographs[18] devoted to the major medical problems.

The monographs were historical in character. They were not chronological recitations, but purported to show the recip-

[17] "United States Government Manual," Washington, D.C., June, 1948, p. 620.

[18] New York Academy of Medicine, "Studies of Committee on Medicine and the Changing Order," Commonwealth Fund, Division of Publication, New York, 1945–1947.

rocal effects of medicine and the social, economic, and political changes that have taken place in American life.

In the final report[19] of the committee the several conditions necessary for satisfactory improvement of medical service were formulated as follows:

1. In extending medical service and perfecting its organization, quality must be preserved.
2. Provision of public health service is a prime essential.
3. Improvement in medical service requires effective use of hospitals with adequate facilities.
4. Success will require trained professional and nonprofessional personnel.
5. For optimal results, organization and cooperation of physicians are required.
6. In the improvement of medical services, voluntary prepayment plans are needed.
7. The goal should be comprehensive medical service.
8. Extensive education for both physicians and the public is necessary.
9. Progress in the extension of medical service must be varied and adapted in each instance to the needs of the community.
10. Government aid will be required.

Children's Charter. The Commission on Children in Wartime of the U.S. Children's Bureau met in Washington, D.C., in March 1942, "A Children's Charter in Wartime" was adopted, and plans were made for continuing the work of the commission. This commission was reappointed in February, 1944, as the National Commission on Children in Wartime.[20] In 1946 it was reconstituted as the National Commission for Children and Youth.

[19] *Ibid.*, pp. 221–232.

[20] U.S. Children's Bureau, "Building the Future for Children and Youth–Next Steps," *Publication* 310, 1945.

The membership of the commission consisted of ninety-five individuals appointed by the chairman and the chief of the Children's Bureau. Its purpose was to arouse citizens to cooperative action in support of public and private services needed to raise the level of health, education, and welfare of children so that they might have full opportunity to develop their potentialities and to become responsible and cooperative members of society. Activities included review of facts, formulation of recommendations, clearinghouse service on proposals for children and youth, and encouragement of state and community planning for youth through councils and commissions.

The Beveridge Report—Great Britain. During the darkest period of the Second World War, Britain appointed an Interdepartmental Committee to examine into the possibility of simplification in the organization and administration of the insurance and assistance programs then in effect. The committee was composed of representatives of eleven departments concerned in one way or another with the administration of the insurances and allied services. These persons and the secretary were all members of the Civil Service except the chairman, Sir William Beveridge.

The report[21] was presented to Parliament at the end of November, 1942. Sir William Beveridge's name alone was signed to the report. It will be recalled that, one hundred years before, Edwin Chadwick was the only signer of the report upon the "Sanitary Condition of the Labouring Population of Great Britain," which was chiefly responsible for the commencement of the organized public health movement in England and in the United States.

The Beveridge report was based upon a review of the existing plans of social insurance and related services; upon studies made by the governmental departments represented

[21] "Social Insurance and Allied Services," Report by Sir William Beveridge, Presented to Parliament by Command of His Majesty, November, 1942, The Macmillan Company, New York, 1942.

on the committee and by subcommittees assigned to special topics; and upon the work of various commissions and the testimony and memorandums of 127 organizations, together with special consultative services obtained from the International Labor Office. The conclusions were those of Sir William Beveridge alone. One fundamental concept served as the basis of the report — a national minimum or a basic income, which, irrespective of need or any means test, every citizen of Great Britain will receive in the event of old age, sickness, unemployment, or vicissitudes, an income toward which he will have contributed and which is his by right of contract.

The Beveridge budget was designed to meet the bare material necessities. It included nothing beyond them. The rest it left to voluntary action of the individual through private insurance and savings. Health needs were assumed to be met through the recommended comprehensive system of health services providing medical and nursing attention in every form. The sickness and disability benefit under the Beveridge report was completely separated from any connection with the administration of the proposed comprehensive health service. The function of *insurance* was to supply income; the function of the *health service* was to provide for prevention and treatment.

In February, 1943, the government announced that it would take up the proposal, and on March 21, 1943 Winston Churchill declared in his world-wide broadcast, "We must establish on broad and solid foundations, a National Health Service." In 1944 the British government issued documents outlining the purpose, scope, finances, and administrative structure of the plan for a National Health Service.[22]

In 1946 the National Insurance Act of 1946 was passed to become effective July 5, 1948. This act practically superseded all earlier legislation on social insurance and consoli-

[22] "A National Health Service," The Macmillan Company, New York, 1944; Karl de Schweinitz, "England's Road to Social Security," University of Pennsylvania Press, Philadelphia, 1943.

dated, extended, and improved the services provided in earlier legislation, which had begun as far back as 1911. The new act differed from and improved upon the old legislation in its comprehensiveness. First, it was open to all—rich and poor, insured or not—on equal terms. Second, the range of services was wider. Third, it consolidated into a single system all of the services. While the Minister of Health was ultimately responsible for all services, the main part of the system, the family physician, was controlled by local executive councils and the hospital service by Regional Hospital Boards, while local authorities were still to be responsible for supplementary services such as midwifery and child welfare.[23]

National Resources Planning Board. By virtue of a public resolution passed by the United States Congress and approved June 17, 1939, the National Resources Planning Board (NRPB) was established in the Executive Office of the President, effective July 1, 1939, by the President's Reorganization Plan I. An Executive Order of September 8, 1939, authorized the board to collect, prepare, and make available to the President, with recommendations, such plans, data, and information as might be helpful to a planned development and use of national resources.

An act of Congress, approved June 26, 1943, abolished the National Resources Planning Board effective August 31, 1943, and authorized the director to wind up its affairs by January 1, 1944.

In the 1943 report of the board[24] there was included a section on health in which it was stated that among the objectives of postwar planning, conservation and enhancement of the health of the people must occupy a prominent position. It was recommended that action be taken in the following directions:

[23] British Information Services, "Britain's Charter of Social Security," New York, 1948.

[24] National Resources Planning Board, "National Resources Development Report for 1943," 78th Cong., 1st Sess., House Doc. No. 128, pp. 60–67, Washington, D.C., January, 1943.

1. Elimination of all preventable diseases and disabilities.
   a. Development of adequate public health services.
   b. Expansion of the health program for mothers and children.
   c. Protection of factory and farm workers against health hazards.
   d. The promotion of health education.
2. Assurance of proper nutrition for all our people.
   a. Renewed efforts to assure every family the minimum income necessary to purchase adequate diets.
   b. Continued support for public and private agencies in the dissemination of sound nutritional practices and principles.
   c. More orderly and economical arrangements for the production and physical distribution of the basic foods essential to health.
   d. Encouragement of the production of foodstuffs for home use by low-income or one-crop farmers.
3. Assurance of adequate health and medical care for all.
   a. Adequate medical care, including measures for rehabilitation, on a basis consistent with the self-respect of the recipient.
   b. Assurance that the total numbers of medical personnel after the war will be adequate for the expanded health services that are indicated.
   c. Distribution of medical personnel over the country more nearly in proportion to need.
   d. Close cooperation between the medical profession and the government in regard to financial problems involved in adequate medical care.
4. Economical and efficient organization of health services.
   a. Better coordination of the medical and health facilities in each community.
   b. Increased use of clinics, health centers, and group practice in order that contemporary methods of organizing the supply of medical care may reflect technological developments and the vast expansion of medical knowledge.

c. Arrangements for the supply of medical care which will free the doctor or the dentist from the necessity of spending time upon functions for which he is not specially trained or which could more economically be performed by a less highly trained person.

Emergency Maternity and Infant Care Program. On March 18, 1943, Congress provided appropriations for an emergency maternity and infant care program.[25] This program was administered by the Children's Bureau through grants to state health agencies for medical, nursing, and hospital care of the wives and infants of enlisted men in the four lowest pay brackets and grades of the Army, Navy, Marine Corps, and Coast Guard. Approximately 87 per cent of enlisted men were in these four lowest groups.

The program was a wartime measure planned only for the duration of the war and six months thereafter. Congress made it clear that this program was not to be administered as a "charity" but as a part of the war effort and as a contribution to the morale of the armed forces.

American Medical Association Council on Medical Service and Public Relations. In 1943 the American Medical Association established a Council on Medical Service and Public Relations[26] in order to further the study of medical care and to facilitate the development of voluntary medical-care insurance. By-laws were adopted by the council and a statement of general policies was set up. In 1945 the council, with the approval of the board of trustees, adopted an entirely new program.[27]

[25] Martha A. Elliott, "Emergency Maternity and Infant Care Program," *Journal of the American Medical Association*, Vol. 124, No. 13, Mar. 25, 1944, pp. 833–838.

[26] Council on Medical Service and Public Relations, American Medical Association, *Bulletin* 21, Chicago, 1943.

[27] Louis H. Bauer, "Medical Care for the American People," *Journal of the American Medical Association*, Vol. 129, 1945, pp. 945–949.

Reorganization Act of U.S. Public Health Service. The Public Health Service Act, signed by President Franklin D. Roosevelt on July 3, 1944, was another milestone in the 146-year history of the U.S. Public Health Service.[28] The act brought together existing laws into a compact and orderly arrangement. It eliminated many outmoded regulations.

The act authorized expansion of the Federal-state cooperative public health programs and provided for the establishment of a national tuberculosis-control program patterned after the venereal-disease program. It retained all the important duties which Congress had laid upon the service in previous legislation enacted over the past half century. Basic responsibilities included: medical and hospital care of American merchant marine seamen, the United States Coast Guard, and other Federal beneficiaries; the National Quarantine Service; scientific research; control of biologic products; and care of lepers and narcotic-drug addicts. Assistance to state and territorial health departments was continued.

The ceiling was raised on Federal appropriations for grants-in-aid to the states for general public health services from 11 million dollars annually (as provided under Title VI of the Social Security Act) to 20 million dollars. It authorized the Public Health Service to use a limited portion of these funds for the training of public health personnel and for special demonstrations in the solution of particular community health problems.

The organization of the Public Health Service provided four major administrative units, as follows: (1) Office of the Surgeon General; (2) National Institute of Health; (3) Bureau of State Services; and (4) Bureau of Medical Services.

A National Advisory Health Council appointed by the Surgeon General was first provided in 1930. It consisted of ten members and functioned as an advisory body to the National Institute of Health.

At present there are several advisory bodies associated with

[28] Public Health Service Act, 1944, *Public Health Reports*, Vol. 59, No. 28, July 14, 1944, pp. 916–917.

the Public Health Service. They are the National Advisory Health Council, National Hospital Council, National Advisory Mental Health Council, National Hospital Survey Committee, Advisory Council of Nurses to the Employees Health Service, Advisory Committee to the Division of Nursing, Committee on Public Education, National Advisory Cancer Council, Sanitation Advisory Board, Board for the Control of Biological Products, Committee of Consultants in Dermatology, and Advisory Committee on Leprosy in the United States.

For purposes of decentralized administration, there are nine district medical directors with headquarters as follows: (1) New York, N.Y.; (2) Richmond, Va.; (3) Chicago, Ill.; (4) New Orleans, La.; (5) San Francisco, Calif.; (6) San Juan, P.R.; (7) Kansas City, Mo.; (8) Denver, Colo.; and (9) Dallas, Tex.

American Public Health Association and National Health Program. On October 4, 1944, the American Public Health Association issued an official statement[29] expressing its policy in regard to a national health program. The association made eight broad recommendations, in brief as follows:

1. *The Services.* A national plan should aim to provide comprehensive services for all the people in all areas of the country. The services should include hospital care, the services of physicians (general practitioners and specialists), supplementary laboratory and diagnostic services, nursing care, essential dental services, and the provision of prescibed medicines and appliances. It is imperative that the plan include and emphasize the provision of preventive services for the entire population. Such services include maternity and child hygiene, school health services, control of communicable diseases, special provisions for tuberculosis, venereal diseases and other preventable diseases, laboratory diagnosis, nutrition,

[29] Medical Care in a National Health Program," *American Journal of Public Health*, Vol. 34, No. 12, December, 1944, pp. 1252–1256.

health education, vital records, and other accepted functions of public health agencies which are now provided for a part of the population.

2. *Financing the Services.* Services should be adequately and securely financed through social insurance supplemented by general taxation or by general taxation alone.

3. *Organization and Administration of Services.* A single responsible agency is a fundamental requisite to effective administration at Federal, state, and local levels. The public health agencies (Federal, state, and local) should carry major responsibilities in administering the health services of the future. The agency authorized to administer such a program should have the advice and counsel of a body representing both the professions and other sources of services and the recipients of services. The principle of free choice should be preserved to the population and the professions.

4. *Physical Facilities.* A program should be developed for the construction of needed hospitals, health centers, and related facilities, including the modernization and expansion of existing structures.

5. *Coordination and Organization of Official Health Agencies.* The activities of the multiple national, state, and local health agencies should be coordinated with the services provided by a national program.

6. *Training and Distribution of Service Personnel.* Within the resources of the program, financial provision should be made to assist qualified professional and technical personnel in obtaining postgraduate education and training. Professional and financial stimuli should be devised to encourage physicians, dentists, nurses, and others to practice in rural areas.

7. *Education and Training of Administrative Personnel.* Education and training of administrative personnel should be encouraged financially and technically, especially for those who may serve as administrators of the medical-care program, for administrators of hospital and health centers, and for nursing supervisors.

8. *Expansion of Research.* Increased funds should be made available to the U.S. Public Health Service and to other agencies of government (Federal, state, and local) and for grants-in-aid to nonprofit institutions for basic laboratory and clinical research.

Wartime Health and Education. On January 2, 1945, the interim report of the subcommittee on Wartime Health and Education[30] made the following eight recommendations: (1) that Federal grants-in-aid to states be authorized now to assist in postwar construction of hospitals, medical centers, and health centers, in accordance with integrated state plans approved by the U.S. Public Health Service; (2) that Federal loans and grants be made available to assist in postwar provision of urban sewerage and water facilities, rural sanitation and water facilities, and milk-pasteurization plants, in communities or areas where such facilities are lacking or inadequate; (3) that state and local governments establish full-time local public health departments in all communities as soon as the needed personnel becomes available; (4) that the United States Army consider the feasibility and advisability of expanding its program for induction and rehabilitation of men rejected because of physical and mental defects; (5) that the medical records of the Selective Service System be preserved and that funds be appropriated for further processing and study of these records; (6) that the output of personnel with training in psychology and psychiatry be increased with a view to providing child-guidance and mental-hygiene clinics on a far wider scale; (7) that Federal scholarships and loans be made available to assist qualified students desiring medical and dental education, and that increased enrollment of women in

[30] "Wartime Health and Education," Interim Report No. 3, *Journal of the American Medical Association*, Vol. 127, Jan. 6, 1945, pp. 36–43.

Interim Report from the Committee on Wartime Health and Education to the Committee on Education and Labor of the U.S., Senate Subcommittee Report No. 3, Government Printing Office, Washington, D.C., January, 1945.

medical and dental schools and premedical and predental courses be encouraged in every way possible; and (8) that Federal funds be made available to states for the medical care of all recipients of public assistance, and that allotment formulas governing distribution of Federal funds to state public-assistance programs be made more flexible in order to give more aid to states where needs are greatest.

National Health Program. On November 19, 1945, President Truman sent a special message[31] to Congress recommending a five-point national health program. This message served to crystallize opinions as to the kind and scope of responsibility government should bear. His promise was, "Our new economic bill of rights should mean health security for all, regardless of residence, station, or race—everywhere in the United States."

His five proposals were: (1) financial and other assistance for the construction of hospitals and other health facilities where they are most needed; (2) increased grants to the states for public health services and maternal and child health programs; (3) support of medical education research; (4) expansion of compulsory insurance under the Social Security system to cover medical, hospital, nursing, laboratory, and dental services supplemented by tax support for medical services for the needy; and (5) cash benefits to cover some of the wage losses incurred during periods of sickness and disability.

The fact that only one of these proposals, that dealing with compulsory sickness insurance, has met with serious opposition indicates the change in public and professional opinion over the past decade. During the preceding era the findings of the Committee on the Cost of Medical Care, the National Health Survey, and other important studies revealed serious unmet medical needs among large sections of the population. These studies have exercised a slow but profound influence on public

[31] Harry S. Truman, "A National Health Program: Message from the President," *Social Security Bulletin*, Vol. 8, December, 1945, pp. 7–12.

opinion about the problems of medical care, but until recently their findings were questioned by organized medicine. Today, however, there is general acceptance of the need to make medical care more readily available to everyone.

Reorganization of Social Security. On May 16, 1946, President Truman announced several reorganization plans under his Executive authority conferred by the Reorganization Act of 1945. Under Reorganization Plan II, which became effective July 16, 1946, the Federal Security Agency was reconstituted under four main operating branches. These were:

1. Social Security Administration, including
   Bureau of Employment Security.
   Bureau of Old Age and Survivors Insurance.
   Bureau of Public Assistance.
   Children's Bureau (transferred from the Department of Labor).
2. Office of Education.
3. Public Health Service.
   National Office of Vital Statistics (transferred from the Bureau of the Census).
4. Office of Special Services, including
   Bureau of Employees Compensation.
   Employees Compensation Appeals Board.
   Food and Drug Administration.
   Office of Community War Services.
   Office of Vocational Rehabilitation.

This reorganization was in line with the announced intention of the President to introduce legislation creating a Department of Health, Education, and Welfare.

American Medical Association National Health Program. On February 14, 1946, the Board of Trustees of the American Medical Association,[32] in accordance with the instruction of the House of Delegates to keep the program up to date,

[32] Bauer, "Private Enterprise or Government Medicine."

adopted a ten-point program, under the title "The National Health Program of the American Medical Association," as follows:[33]

1. Minimum standards of nutrition, housing, clothing, and recreation are fundamental to good health.

2. Preventive medical services should be available to all and should be rendered through professionally competent health departments. Medical care to those unable to provide for themselves should be administered by local and private agencies with the aid of public funds when needed, preferably by a physician of the patient's choice.

3. Adequate prenatal and maternity care should be made available to all mothers. Public funds when needed should be administered by local and private agencies.

4. Every child should have proper attention, including scientific nutrition, immunization, and other services included in infant welfare. Such services are best applied by personal contact between the mother and the individual physician but may be provided through child health centers administered locally with support by tax funds whenever the need can be shown.

5. Health and diagnostic centers and hospitals necessary to community needs are preferably supplied by local agencies. When such facilities are unavailable, aid may be provided by Federal funds under a plan similar to the provision of the Hill-Burton bill.

6. Voluntary health insurance for hospitalization and medical care is approved, the principle of such insurance plans to be acceptable to the Council on Medical Service and to authoritative bodies of state medical associations.

7. Medical care, including hospitalization, should be provided for all veterans, preferably by a physician of the veteran's choice, with payment through a plan agreed on between the state medical association and the Veterans Administration.

[33] "National Health Program," *Journal of the American Medical Association*, Vol. 130, 1946, p. 641.

8. Research for the advancement of medical science, including a National Science Foundation, is endorsed.

9. Services rendered by volunteer philanthropic health agencies should be encouraged.

10. Widespread education in health and the widest possible dissemination of information regarding the prevention of disease and its treatment are necessary functions of all departments of public health, medical associations, and school authorities.

American Medical Association Associated Medical Care Plans. Growing out of the deliberations of the American Medical Association's Council on Medical Service, the Associated Medical Care Plans, Inc., was organized in 1946. Its purpose was

> . . . to promote the establishment and operation of such nonprofit voluntary medical care plans throughout the United States and Canada as will adequately meet the health needs of the public and preserve and advance scientific medicine and the high quality of medical care rendered by the profession of the two Countries.

Among the objects stated in the constitution of the corporation was included the following:

> Inherent in those objects is a recognition that State and local medical care plans should be autonomous in their operation so that the needs, facilities, resources, and practices of their respective areas can be given due consideration, but that the health and welfare of the public is advanced by the coordination, through the medium of this Corporation, of methods, coverages, operations and actuarial data.

The Council on Medical Service of the American Medical Association set up standards of approval for the medical-care plans and has granted those plans which meet the standards[34] the privilege of using a "Seal of Acceptance" of the American Medical Association.

[34] "Standards of Approval for Medical Care Plans," *Journal of the American Medical Association*, Vol. 131, 1946, p. 913.

At present all forty-eight states either have plans or are working on the development of prepayment plans. The American Medical Association has set up a Division of Prepaid Medical Care Insurance under the Council of Medical Service to facilitate the development of these plans.

Health and Welfare Fund, United Mine Workers. A new departure in medical care arose in 1946 with the agreement to establish a health and welfare fund in the United Mine Workers' Union. The agreement was entered into May 29, 1946, between the Secretary of the Department of the Interior, acting as Coal Mines Administrator under authority of Executive Order 9728, dated May 21, 1946, and the United Mine Workers of America. The terms of the agreement provided (1) a welfare and retirement fund, (2) a medical and hospital fund, and (3) coordination of the welfare and retirement fund and the medical and hospital fund. Section 5 of the agreement provided that the Coal Mines Administrator should make a comprehensive survey and study of the hospital and medical facilities, medical treatment, and sanitary and housing conditions in the coal-mining areas. The purpose of the survey was stated to determine the character and scope of improvements which should be made in the fields of study.

The Coal Mines Administrator appointed Vice Admiral Ben Moreel of the United States Navy as deputy administrator and, together with the administrator and with the approval of the President, selected Rear Admiral Joel T. Boone of the Medical Corps of the United States Navy to conduct the survey.

On March 17, 1947, a report, "A Medical Survey of the Bituminous-Coal Industry," was submitted. It is unique in public health because it represents the first nationwide survey of an industry conducted under government auspices. The report itself is a thoroughgoing examination of the health and welfare conditions in this particular industry.[35]

[35] Report of the Coal Mines Administration, "A Medical Survey of the Bituminous-Coal Industry," Washington, D.C., 1947.

National School-lunch Program. On June 4, 1946, President Truman signed the National School Lunch Act. This act placed upon a permanent basis a school-lunch program that had been conducted on a temporary basis since 1935. The appropriation for the fiscal year 1946–1947 was 75 million dollars, of which 10 million was earmarked for equipment. Administration of the program was placed in the Department of Agriculture. Funds are granted to states on a basis of the number of children between five and seventeen years of age and income per person in each state as compared to the national average. The funds granted to each state are disbursed by the state department of education, unless the laws in that state prohibit the department from doing so.

Money from the Federal government must be matched dollar for dollar from state sources until June 30, 1950, after which the state's contribution must be $1.50 for each $1.00 obtained from Federal funds. After June 30, 1955, the state must provide $3 for each $1 received from Federal sources.

The school lunch must be provided to all children in the school regardless of ability to pay. Both public and nonprofit private schools are eligible to participate in the program.[36]

National Mental Health Act. On July 3, 1946, the National Mental Health Act[37] went into effect under the U.S. Public Health Service. Congress provided for the establishment of a National Mental Health Institute to conduct a program of research upon the causes, prevention, diagnosis, and treatment of mental and nervous diseases. The act allots grants-in-aid for research to public and private nonprofit in-

[36] Margaret M. Morris, "Congress Gives the Go Sign to School Lunches," *The Child*, Vol. 11, No. 2, August, 1946, p. 38.

[37] Robert H. Felix, "The Relation of the National Mental Health Act to State Health Authorities," *Public Health Reports*, Vol. 62, Jan. 10, 1947, pp. 41–49; William L. Russell, "The National Mental Health Act." *The American Journal of Psychiatry*, Vol. 103, November, 1946, pp. 417–420.

stitutions and to individuals. It further authorizes financial assistance to similar institutions for training psychiatric and other personnel concerned with the diagnosis, treatment, and care of mental patients and to individuals for such training. It also provides allotments of grants-in-aid to the states for the development of community health services, for the conduct of demonstrations by the U.S. Public Health Service, and for other activities designed to promote the mental health of the nation.

A National Advisory Mental Health Council was appointed by the Surgeon General to assist in making plans for implementing the act and to make recommendations in the grants-in-aid.

Federal Reorganization Plan. Effective on July 16, 1946, the President's Reorganization Plan II of 1946 transferred the Children's Bureau (with the exception of the child labor functions under the Fair Labor Standards Act) from the Department of Labor to the Federal Security Administrator. Under the same authority the vital-statistics functions were transferred to the Public Health Service from the Bureau of the Census of the Department of Labor.

Health Programs for Government Employees. An act approved August 8, 1946, provided for the establishment of a preventive medical program for Federal employees.[38] Heads of departments and agencies of the Federal government, after consulting with the U.S. Public Health Service, were authorized to establish employee health programs for the purpose of promoting and maintaining the physical and mental health of Federal employees.

Some of the recommendations made by the Public Health Service were that (1) all employees' health-service programs be preventive health programs; (2) the professional responsi-

[38] Bureau of Medical Services, "Health Services for Federal Employees," *Public Health Reports*, Vol. 61, Nov. 15, 1946, pp. 1641–1654.

bility for the health-service programs be vested in the physician in charge of the agency's employees' health service; (3) the number of physicians per unit of population be one physician for 4,000 to 6,000 employees; and (4) the number of nurses per unit of population be that recommended for industry—one nurse for up to 300 employees, three nurses for the first 1,000 employees, one nurse for each additional 1,000 employees up to 5,000 employees, and one nurse for each further additional 2,000 employees.

The basic health program, comprising medical, dental, and nursing service, shall include the following: (1) promotion of the individual employee's optimal health; (2) diagnostic and advisory services; (3) treatment, medical and dental, as defined by the act; (4) prevention of disease; (5) analysis of statistics and services; (6) maintenance of all medical records of employees as confidential medical information; and (7) interpretation of findings to personnel and management officials and collaboration with personnel officials in planning and carrying out various over-all aspects of the program.

Hospital Survey and Construction Act. The Hill-Burton Act,[39] passed by Congress on August 13, 1946, provided Federal grants to states for the construction of hospitals and health centers. Its objective was to bring adequate hospital facilities to all communities. It encouraged over-all state planning of an ordered network of facilities by requiring each state, as a prerequisite to obtaining Federal aid, to study existing hospital resources and unmet needs, then to develop its own master construction plan conforming to certain minimum standards set at the Federal level. The amount of the Federal allotment available to each state was determined according to the state's relative economic status by a variable-grant formula. However, on each approved project the Federal contribution was fixed at a flat one-third of the cost. Congress

[39] V. M. Hoge, "The Hospital Survey and Construction Act," *Public Health Reports*, Vol. 62, Jan. 10, 1947, pp. 49–54.

was authorized to appropriate 375 million dollars over a five-year period for construction, as well as 3 million for state surveys and planning.

The act provided no funds for *maintenance* of hospitals but was limited to *construction*. The President signed the bill on August 13, 1946, and it became Public Law 725.

The history of this act illustrates the power of concerted action in a democratic nation. After its introduction in Congress the bill had the immediate support of the hospital associations and all major farm and labor organizations, organized medicine, dentistry, and nursing as well as numerous groups of national importance.

With the enactment of this act the Hospital Facilities Section of the States Relations Division in the U.S. Public Health Service was reconstituted as the Division of Hospital Facilities under the Bureau of State Services.

U.S. Public Health Service. The 80th Congress which convened in 1948 passed appropriations for the U.S. Public Health Service of over 160 million dollars. Of this amount $17,320,000 was earmarked for the control of venereal diseases, 40 million dollars for construction of a medical research center, 14 million for cancer research and control, nearly 14 million for medical research through the National Institute of Health, nearly 10 million for tuberculosis control, and 7½ million for control of communicable diseases.

It also passed the National Heart Act on June 16, 1948, a grant of $3,144,088 for increased research in cardiovascular diseases, and the National Dental Research Act on June 12, 1948, with an appropriation of $750,000, together with a special appropriation of 1 million dollars for the establishment of demonstration units to study the use of a sodium fluoride solution in preventing dental decay among children.

Health Measures Considered by Congress. The 80th Congress considered (but failed to act upon) a number of health

bills. It failed to increase the 18-million-dollar appropriation for grants to the states for vocational rehabilitation. It neglected to provide 12 million dollars a year to assist states in establishing and maintaining school health services. It did not provide Federal aid to states in establishing full-time local public health services. It failed to provide for research in poliomyelitis and other diseases. No Federal aid was given to states in providing various expensive drugs and medical services. No funds were appropriated to establish a national science foundation that would be authorized to support basic medical research.

National Health Assembly. A National Health Assembly called by the Federal Security Administration was held in Washington, D.C., on May 1–4, 1948. This meeting was convened at the request of President Harry S. Truman to guide the Federal Security Administration in drawing up a ten-year health program for the nation.[40]

About 800 representatives of the health professions, of labor, and of farm and consumer groups were in attendance. The summarized recommendations of the conference were: (1) more public health facilities, and more doctors and nurses are needed, especially in the rural areas; (2) localities with low per capita income and substandard income should receive aid from state and Federal governments; (3) research and medical education should be aided by government funds; (4) the insurance principle as a method of spreading sickness costs in predictable fashion should be extended; (5) health insurance should be supplemented by use of tax resources for low-income groups and for other persons for whom special public responsibility is accepted; and (6) high standards of service should be encouraged through greater coordination of services of physicians, hospitals, and other health agencies.

[40] "Health for the Nation," *The Survey Mid-monthly*, June, 1948. Oscar R. Ewing, "The Nation's Health—A Ten Year Program," Report to the President, Federal Security Agency, Washington, D.C., 1948.

World Health Organization. At the United Nations Conference on International Organization in San Francisco in 1945, health was recognized in Article 55 of the Charter of the United Nations as a field of interest with which the United Nations should concern itself. Article 57 of the charter envisaged the establishment by intergovernmental agreement of a specialized health agency with wide responsibilities.

The interest of the United States in this project was made evident in a number of ways. It supported the resolution at San Francisco that a specialized health agency should be established. The Department of State called together an advisory health group in October, 1945, to examine a draft constitution prepared by the Department of State and the U.S. Public Health Service. In December, 1945, Congress passed a resolution requesting the President to take immediate steps toward convening a health conference and forming an international agency. These developments are of particular significance in the light of subsequent actions by the 80th Congress.

Two antecedent events had influence upon the health developments that were to take place. The first event was the Conference on Food and Agriculture held at Hot Springs, Va., in June, 1943. This conference declared that "the first cause of hunger and malnutrition is poverty, and the primary responsibility lies with each nation for seeing that its own people have the food needed for life and health." Out of this conference came the Food and Agriculture Organization (FAO), the first of a series of new organizations which, with their prewar prototype, the International Labor Organization (ILO), constitute the specialized agencies of the United Nations.

The second event was the establishment of the United Nations Relief and Rehabilitation Administration (UNRRA)[41] in November, 1943. Among the functions and duties of UNRRA was the provision of basic medical services for vic-

[41] Wilbur A. Sawyer, "Achievements of UNRRA as an International Health Organization," *American Journal of Public Health*, Vol. 37, January, 1947, pp. 41–58.

tims of war under the International Sanitary Convention of 1944, modifying the International Sanitary Convention of June 21, 1926. The total expenditures for health over a period of about three years were close to 168 million dollars. Approximately 1,100 international professional health workers were employed. As soon as the shipping lanes were cleared, UNRRA dispatched thousands of tons of DDT powder, hundreds of dust pumps, and a trained staff to assist local health workers throughout the world. UNRRA functions were transferred to the World Health Organization (WHO) Interim Commission on December 9, 1946.

At the first session of the Economic and Social Council of the United Nations held on February 15, 1946, a resolution was adopted calling an International Health Conference to meet not later than June 20, 1946. This resolution also provided for a Technical Preparatory Committee (the Interim Commission), composed of eighteen experts from as many countries, to meet in Paris in March, 1946, to prepare basic documents for the conference. This meeting was held March 18 to April 6, 1946. The Economic and Social Council in May and June, 1946, examined the report of the Technical Preparatory Committee and approved the recommendations.

On June 19, 1946, an International Health Conference was convened in New York by the Economic and Social Council of the United Nations.[42]

The conference was attended by representatives of all members of the United Nations, by observers from thirteen states not members of the United Nations, by the control authorities of Germany, Japan, and Korea, and by ten international organizations with interest related to health. The observers were given the right to speak but had no vote.

The constitution of the World Health Organization was

[42] International Health Conference, New York, N.Y., June 19 to July 22, 1946, "Report of the United States Delegation: Including the Final Act and Related Documents," Department of State, Washington, D.C., Conference Series, *Publication* 2703, 1947.

signed July 22, 1946, and consisted of a preamble and 19 chapters.[43] At the same time a protocol providing for the absorption of the *Office international d'hygiène publique* was also signed. The functions of the Health Organization of the League of Nations and the health functions assigned to UNRRA by the international maritime and aerial sanitary conventions of 1944 were transferred to the WHO. It was provided that the constitution would become effective when it had been accepted by twenty-six members of the United Nations. This was accomplished on April 7, 1948, but the United States was not among the accepting nations, although President Truman, on March 21, 1947, sent a message to Congress endorsing a joint resolution providing for United States membership and participation.

On June 18, 1948, membership of the United States in the WHO was completed when President Truman signed the joint resolution of Congress providing for membership and also the instrument of acceptance of the constitution. Congress, however, specified that the United States reserved the right to withdraw its membership on one year's notice so long as its financial obligations had been met in full for the WHO current fiscal year.[44]

The first World Health Assembly convened in Geneva, Switzerland, on June 24, 1948, with delegates present from fifty-two of the fifty-four states then members of the organization.[45] In addition, observers were present from eleven non-

[43] H. van Zile Hyde, "World Health Organization—Progress and Plans," Department of State, Washington, D.C., International Organization and Conference Series, *Publication* 3126, 1948. The constitution is printed in full.

[44] Public Law 763, 80th Cong., 2d Sess.; approved June 14, 1948.

[45] James A. Doull, and Morton Kramer, "The First World Health Assembly," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Public Health Reports,* Vol. 63, No. 43, October, 1948, pp. 1379–1403.

"World Health Organization, United Nations," Report of the Interim Commission, Part I, Activities, New York, June, 1948.

member states, from the allied control authorities for Germany, Japan, and Korea, and from ten other international governmental organizations.

The United States delegation was seated by the Assembly, on a provisional basis, with full rights. This action became necessary because of the reservation by the 80th Congress. There was no provision in the constitution of the WHO for the withdrawal of a nation once it had accepted membership in the organization. On July 2, 1948, a plenary session of the Assembly was held to decide upon the question of membership of the United States. The solution was the adoption of a proposition of general application that any member could terminate its membership on one-year's notice. The United States, therefore, became the fifty-sixth member of the WHO on June 21, 1948, the date of the receipt of its Instrument of Acceptance by the Secretary-General of the United Nations.

The Assembly continued in session until July 24, 1948. It set up a practical program, a budget, and a scale of contributions to launch the organization on its first year of operation. It elected an executive board and a director general. It selected a headquarters site. It delineated regional areas in which it was desirable to establish regional organization. It reached agreement on other matters essential to the efficient operation of the organization.

The Assembly adopted a program with special emphasis upon diseases having major impact upon the peoples of the world. These were malaria, tuberculosis, and the group of venereal diseases with special reference to syphilis. Emphasis was also placed upon maternal and child health, nutrition, and environmental sanitation. Budgets were adopted covering the years 1948 and 1949. The 1948 budget provided for WHO activities from September 1, the date of the official termination of the Interim Commission, through the end of the year. The 1949 budget of 5 million dollars provided for the full program adopted by the Assembly.

An executive board of eighteen members for terms of three years was elected, one of which was the United States mem-

ber elected by allotment for a one-year term. Dr. Brock Chisholm of Canada, executive secretary of the Interim Commission, was elected director-general of the organization for a term of five years. Geneva, Switzerland, was selected as the permanent headquarters. Regional administrative areas were adopted covering six broad regions.

Thus a powerful single international organization dealing with health problems of the world came into being.

Summary

Growing out of the depression following the stock-market crash in October, 1929, and the nationwide distress that ensued, the national government began in 1933 a series of measures for relief that led to the Social Security Act of 1935. Practically every Congressional inquiry revealed the impact of disease upon the people. Federal government programs for medical care began to appear. Among these programs was one to provide for compulsory sickness insurance, which made its first appearance in Congress in 1939 and has been before Congress continuously since that date. With the declaration of war upon the United States by Japan December 7, 1941, and by Germany and Italy on December 11, 1941, the attention of the nation was concentrated upon war, man power, production, and military armament. As in the past the need for restoration, conservation, and promotion of health grew out of these efforts. With the ending of hostilities with Italy in September, 1943, with Germany in May, 1945, and with Japan in August, 1945, the Congress turned its attention to domestic problems, among which were measures for the expansion of existing health facilities as well as closer coordination of Federal, state, and local health services. The health of all the people of the nation now became a national problem. Laws and appropriations passed by Congress sought to provide services and facilities to meet the problems revealed. Readjustments in state and local health programs became widespread owing to the active participation of the Federal government. There was a tremendous increase in

the provisions for research in the major areas of disease. In its adherence to the WHO the United States recognized the unequal development in the restoration, conservation, and promotion of health throughout the world.

Suggested Reading

Commission on Hospital Care, "Hospital Care in the United States," Commonwealth Fund, Division of Publication, New York, 1947.

Mott, Frederick D., and Milton I. Roemer, "Rural Health and Medical Care," McGraw-Hill Book Company, Inc., New York, 1948.

"United States Government Manual," The National Archives, Division of the Federal Register, Washington, D.C., 1948.

Doull, James A., and Morton Kramer, "The First World Health Assembly," from Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Public Health Reports*, Vol. 63, No. 43, Oct. 22, 1948, pp. 1379–1403.

Kaplan, Sheldon Z., "80th Congress and the United Nations," Department of State, Washington, D.C., *Publication* 3302, International Organization and Conference Series III, 17, 1948.

CHAPTER 15

UNOFFICIAL PUBLIC HEALTH ORGANIZATIONS

A review of the five eras of public health work as outlined indicate that dynamic processes have been set in motion in England and in the United States to meet the problems of disease and health. These processes are revealed in each of the eras with varying emphasis. They are, in order: (1) a survey to discover the problem or problems; (2) the application of the statistical method in the survey; (3) the interpretation of the facts thus revealed; (4) the communication of the interpretation to the people affected as individuals or as members of the community; (5) the crystallization of the interpretation in legislation or group action; and (6) the necessity for maintaining or modifying legislation to meet changing needs.[1]

The development of public health programs for the restoration, conservation, and promotion of health in Great Britain and the United States follows, in the main, the pattern just outlined. When group action expressed in legislation is achieved, it takes form either in a method of organization (structure) or in a method of administration (function). These are the ways in which public opinion expresses itself. One illustration will suffice. A study of the vast material produced in this country bearing upon the subject of compulsory sickness insurance reveals that the first two steps in

[1] For discussions and directories see the various issues of the "Social Work Year Book," 1929–1947; "Handbook of Scientific and Technical Societies and Institutions of the United States and Canada," 5th ed., *Bulletin* 115, April, 1948, National Research Council, Washington, D.C.

the progression have been completed. The United States is in the throes of the next four steps. There are differences in the validity of the interpretation of the facts. The communication of these differences in interpretation leads to confusion and doubt on the part of the individual and the community. This confusion and doubt prevents a crystallization of interpretation in legislation or group action, and until this confusion and doubt is cleared away legislative action will be difficult.

Evidence of these processes is to be discerned in each of the eras under review. In the era of sanitation it took an Edwin Chadwick to organize and interpret the material and a Southwood Smith and a Lemuel Shattuck to communicate its interpretation. In the era of infectious disease it took a Louis Pasteur and a Robert Koch to discover and interpret the material and a Joseph Lister, a Stephen Smith, and a William H. Welch to communicate the interpretation. In the era of hygiene it took a Hermann Brehmer, a Peter Dettweiler, and an Edward L. Trudeau to develop and interpret the ideas and a Lawrence Flick and a Hermann Biggs to communicate the interpretation. The last two eras outlined are too close to present-day experience to permit any attempted individualization.

In the process of communication of the facts and their interpretation one observes the resort to organization as a means to that end. Witness the Health of Towns Association in Great Britain, the American Public Health Association, the National Tuberculosis Association, the Milbank Memorial Fund, and the more than one hundred national agencies dealing directly with health problems in the United States. Similar developments are to be found in Great Britain.

Winslow has stated:

> The mobilization of the lay forces of the community for the control of disease is today such an obvious fact—such an almost omnipresent fact—in American life that it is a little difficult to realize how novel a conception it was twenty-five years ago. Medicine was an affair for medical men in those days, still hedged

about with the ritual of an almost magical art; and the discovery of the possibilities of wide-spread social organization as a means of controlling disease was one which may almost be placed alongside the discovery of the germ theory of disease itself as a factor in the evolution of the modern public health campaign. Up to 1900 the war against disease—like the wars between nations up to 1914—was a business for the professional. Today, both types of warfare are carried on by the people as a whole.[2]

Throughout the history of the public health movement it is evident that the real leadership has come mainly from individuals. The records of 110 years of struggle against disease as one of the Four Horsemen of the Apocalypse—War, Famine, Disease, and Death—are replete with the effectual and ineffectual implementation of ideas. And in no instance is there evidence of the final and conclusive victory. There is a constant ebb and flow in the process. Sanitation, bacteriology and immunology, hygiene, health education, social insurance, and world health—all point to the ever-changing and determined effort to bring to individuals throughout the world an equal chance at a healthful life. Public health is dynamic, not static.

Public health work in the United States is performed by official and unofficial organizations. Much of the pioneering work has been done by the unofficial organizations. A classification of these may be made on the basis of their original purposes—professional, promotional, social foundations, and other types of health services.

Professional Organization. The professional organizations are those in which active membership is limited to persons with specified professional qualifications. They are organized usually for the improvement of members, maintenance of professional ethics, standardization of techniques, improvement of preparation, maintenance of educational qualifications, and advancement of professional interests. Their income and

[2] C.-E. A. Winslow, "The Life of Hermann M. Biggs," Lea & Febiger, Philadelphia, 1929, p. 200. By permission.

support come almost exclusively from within the profession. Until about 1910 these organizations, with the exception of the American Public Health Association, evinced little—or at best—sporadic interest in the discussion or development of the public health movement. Since the turn of the century the method of organization has been for the individual member to join his local unit, which in turn is the constituent member of the state unit, and it in turn is the representative of the profession in the given state in the national organization.[3]

Practically all of these organizations publish annually their proceedings or transactions, maintain a periodic journal, issue reports of researches and studies, and in some cases even distribute for popular consumption leaflets, pamphlets, posters, and films dealing with aspects of medicine and public health. Most of these organizations have published official histories.

Some of the early professional organizations active at present are:

1839—American Statistical Association.
1844—American Psychiatric Association.
1847—American Medical Association.
1848—American Association for the Advancement of Science.
1852—American Pharmaceutical Association.
1857—National Education Association.
1859—American Dental Association.
1863—American Veterinary Medical Association.
1872—American Public Health Association.
1874—National Conference of Social Work
1876—American Association on Mental Deficiency.
1876—American Chemical Society.
1884—Conference of State and Provincial Health Authorities of North America.

[3] Harold M. Cavins, "National Health Agencies, A Survey with Especial Reference to Voluntary Associations, Including a Detailed Directory of Major Health Organizations," Public Affairs Press, Washington, D.C., 1945.

1885—American Association for Health, Physical Education and Recreation.
1897—American Nurses Association.
1899—American Hospital Association.

Almost without exception the early histories of these associations are repetitious ones of internal struggle between individual leaders, false starts as to direction, and vague ideas on the methods to be employed to implement purposes often reflected in a change of name of the association. This is exhibited quite clearly in the history of the American Medical Association,[4] the largest, strongest, and most influential in the professional group. It took almost fifty years for this association to arrive at a smooth-working pattern of organization whereby the individual member was integrated into the association. This occurred in 1901, and since then the formula adopted—individual member, local society, state society, national association—has been adopted by others of the professional groups.

American Public Health Association. Since the American Public Health Association is the only professional, and at the same time the most influential organization in the United States devoted exclusively to the interests of public health, a brief account of it is given.[5] The original impetus for an organization[6] of this character came in 1857, when the first National Quarantine Convention was held in Philadelphia to dis-

[4] Morris Fishbein, "A History of the American Medical Association, 1847–1947," W. B. Saunders Company, Philadelphia, 1947.

[5] My thanks are due Willimina Rayne Walsh, Associate Secretary, American Public Health Association, for careful examination of this description.

[6] M. P. Ravenel (ed.), "A Half Century of Public Health," American Public Health Association, New York, 1921.

Cavins, *op. cit.*

Richard H. Shryock, "The Origins and Significance of the Public Health Movement in the United States," *Annals of Medical History*, 1929, n.s. 1, p. 647; "The Early American Public Health Movement," *American Journal of Public Health*, Vol. 27, No. 10, October, 1937, p. 965.

cuss the unsatisfactory conditions of maritime quarantine laws. In the meeting held in 1858 at Baltimore there was added to the discussion the internal hygiene or sanitary arrangements of cities. Other meetings were held in New York in 1859 and in Boston in 1860, and plans were made to hold a meeting in Cincinnati in 1861. These plans were never consummated because of the advent of the Civil War.[7]

On September 12 and 13, 1872, the American Public Health Association was organized at Long Branch, N.J. Of the ten men who helped to prepare for the organization meeting, nine were physicians and one was an architect. Most of the nine physicians were engaged in their local communities as health officers. Four of the men had served in the early National Quarantine and Sanitary Convention.

The association "had its origin in the natural desire which thinkers and workers in the same field, whether of business or philanthropy, or the administration of civil trusts, have for mutual council, advice and cooperation."[8] Membership was direct and open to anyone, professional or layman, who was interested in sanitary science. Annual membership dues were $5. No subject pertaining to the advancement of public health from 1872 to the present has failed to be discussed at the association's annual meetings.[9] At a reorganization meet-

[7] Proceedings of the National Quarantine and Sanitary Conventions: 1857, Philadelphia; 1858, Baltimore; 1859, New York; 1860, Boston.

Harold M. Cavins, "The National Quarantine and Sanitary Conventions, 1857–1860 and the Beginnings of the American Public Health Association," *Bulletin of the History of Medicine*, Vol. 13, No. 4, April, 1943, pp. 404–426.

[8] Stephen Smith, "Historical Sketch of the American Public Health Association," in Ravenel, *op. cit.*, pp. 1–12.

Constitution and By-laws adopted October 8, 1947, Year Book, 1947–1948, *American Journal of Public Health*, May, 1948, pp. 8–15.

[9] Proceedings published annually in *Public Health, Reports and Papers of the American Public Health Association*, 1873–1895; succeeded by *Journal of the American Public Health Association*, quarterly 1895 to 1898. In 1899, the annual volume was returned to and it continued until 1908. In 1908, the papers were published by the

ing in 1922 membership was divided into fellows ($12 annually), members ($7 annually), and sustaining ($200 annually). The membership comes from the United States, Canada, Mexico, and Cuba.

At present the association has two regional branches—the Western (1930), and the Southern (1932)—and twenty-eight affiliated societies, most of which are on a state basis,[10] and a membership of approximately 11,500. From time to time, as new subjects of importance come to the fore, the association provides "Sections." These Sections are: Laboratory (1899); Health Officers (1908); Vital Statistics (1908); Engineering (1911); Industrial Hygiene (1914); Food and Nutrition (1917); Maternal and Child Health (1921); Public Health Education (1922); Public Health Nursing (1923); Epidemiology (1929); School Health (1942); and Dental Health (1943).

In addition the association has four standing committees: (1) Administrative Practice (1920); (2) Eligibility (1930); (3) Research and Standards (1930); and (4) Professional Education (1932). Over one hundred special committees work on various phases of the public health movement.[11] The association maintains information, employment, and book services; holds annual meetings; publishes monthly the

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American Journal of Public Hygiene, and in 1911 the present *Journal of the American Public Health Association* was begun. Twelve annual *Yearbooks* have been published as supplements to the *Journal* in the period from 1931 to 1942. After a lapse caused by the Second World War the Yearbooks were resumed in 1947–1948.

[10] 1922, Michigan; 1925, Massachusetts, New Mexico, Pennsylvania, Texas; 1927, Northern California, Southern California, Ohio, West Virginia; 1928, Connecticut, Missouri, South Carolina; 1930, Georgia; 1932, Florida; 1936, New York City; 1938, Arizona, Colorado, Utah; 1939, Idaho, Tennessee; 1940, Cuba, Iowa; 1941, Illinois, Puerto Rico; 1943, Kansas; 1945, South Dakota; 1946, North Dakota.

[11] These all publish reports from time to time. The association has published for many years a "Bibliography on Public Health and Allied Subjects," the 1948 edition being the twenty-sixth. This, together with a brief description of the American Public Health Association, are for free distribution.

American Journal of Public Health; conducts surveys of local and state official and unofficial organizations and their programs; and has set authoritative standards and methods in most phases of public health procedure throughout the United States, Cuba, and Mexico which are generally accepted and followed.

The policy-making body of the association is the Governing Council. It consists of thirty elected members, forty-one section officers, eight association officers, and representatives of twenty-eight affiliated societies. An Executive Board of nine members is chosen from the Governing Council.

Promotional Organizations. The growth of the promotional type of unofficial public health organization[12] in the United States was initiated[13] with the highly effective and successful movement against tuberculosis.

Haven Emerson, in his introduction to Moore's "Public Health in the United States" in 1923 wrote:

> Beginning with the effort of that small group of enthusiastic physicians[14] whose inspiration lit the torch of popular education in this Country as to the curability and preventability of tuberculosis twenty-five years ago, there has spread throughout the Nation gradually but with increasing force and speed a wave of public and popular interest in health, its protection and promotion, which history will record as one of the most enlightened movements of the past Century.

Some of the early promotional organizations[15] active at present are:

[12] White House Conference on Child Health and Protection, Committee on Public Health Organization, Section II, "Public Health Service and Administration," Appleton-Century-Crofts, Inc., New York, 1932, pp. 225–256.

[13] Kendall Emerson, "National Non-official Health Services," in Haven Emerson, "Administrative Medicine," Thomas Nelson & Sons, New York, 1941, Chap. 17, pp. 705–713.

[14] He should have included laymen as well. By permission.

[15] *Social Work Year Book* No. 9, Russell Sage Foundation, New York, 1947, Directory of Agencies, Part II, pp. 565–670.

1904—National Tuberculosis Association.
1906—National Recreation Association.
1909—National Committee for Mental Health Hygiene.
1911—Joint Committee on Health Problems in Education.
1913—American Cancer Society.
1913—National Safety Council.
1914—American Social Hygiene Association.
1915—National Society for the Prevention of Blindness.
1918—The Maternity Center Association.
1919—American Hearing Society.
1921—National Society for Crippled Children and Adults.
1921—National Health Council.
1922—American Heart Association.
1922—American Rehabilitation Committee.

A few of these promotional health organizations have been successful in establishing the pattern of membership structure adopted by the professional organizations—individual, local, state, and national. The financial arrangements of these organizations vary widely. Some depend on memberships. Others supplement this method by such devices as special contributions from individuals and/or foundations, seal sales, tag days, and sundry methods.

Broadly viewed, these promotional health organizations are concerned with: (1) specific diseases, such as tuberculosis, syphilis and gonorrhea, cancer, and the like; (2) safeguarding specific organs or functions of the body, such as eyes, ears, teeth, and heart; and (3) promotion of special groups of society, such as maternal and child hygiene, mental hygiene, personal safety, and similar areas of interest.

National Tuberculosis Association. Since the National Tuberculosis Association is historically the first and actually the most effective type of promotional unofficial health organization in the United States, a brief description of it is presented.[16]

[16] My thanks are due Frederick D. Hopkins, Executive Secretary, National Tuberculosis Association, for careful examination of this description.

The National Tuberculosis Association was organized at Atlantic City,[17] N.J., on June 6, 1904. The reasons for its organization are to be found in the history of tuberculosis as an ubiquitous disease at the time. The facts about the disease[18] leading up to the organization were: (1) the invention of the stethoscope by René Laënnec (1781–1826), a French physician, in 1819; (2) the animal experiments between 1865 and 1869 of Jean Villeman (1827–1892), a French physician, which proved that tuberculosis was due to a specific infection by an inoculable agent; (3) the production by feeding experiments of bovine tuberculosis demonstrated by Edwin Klebs (1834–1913), a German pathologist, who with Pasteur was perhaps the most important precursor in the bacterial theory of infection; (4) the discovery of the tubercle bacillus in 1882 by Robert Koch (1843–1910), a German physician; (5) the establishment by Edward L. Trudeau (1848–1915) of the Adirondack Cottage Sanatorium at Saranac Lake, N.Y., in 1885; (6) in 1887 the dispensary treatment of tuberculosis by Robert W. Philip (1857–1912) in Edinburgh; (7) the administrative attack upon tuberculosis by Hermann M. Biggs (1859–1923) between 1889 and 1897 in New York City; (8) the organization in 1892 of the Pennsylvania Society for the Prevention of Tuberculosis at Philadelphia by Lawrence F. Flick (1856–1938); (9) the discovery of the X ray in 1895 by the German physicist William Roentgen (1845–1922); (10) the demonstration in 1896 by the American pathologist Theobald Smith (1859–1934) that human and bovine tubercle bacilli were distinct species; and (11) the introduction in 1903 by William Osler (1849–1919) of the first tuberculosis nurse in Baltimore, Md.[19]

[17] "Past and Present Trends in the Tuberculosis Movement," Historical Series 1, National Tuberculosis Association, New York, 1942.

[18] Gerald B. Webb, "Tuberculosis," Clio Medica series, Paul B. Hoeber, Inc., New York, 1936.

[19] Robert G. Paterson, "The Tuberculosis Movement in the United States of America, 1882–1904," Historical Series 1, National Tuberculosis Association, New York, 1942.

The hiatus between 1882 and 1892 is accounted for by the unfulfilled promise of Koch that tuberculin would prove to be either a specific cure or an effective preventive agent. The gap between 1892 and 1904 was due to the confused interpretation of the application of Koch's discovery, the promise of tuberculin as a preventive or cure, and the accumulation of evidence of the communicability of the disease as opposed to the belief in its hereditary character.[20]

The National Tuberculosis Association is an unofficial organization of physicians and laymen. There is a state association in each state and in the District of Columbia. These, together with the five associations—New York City, Brooklyn, Chicago, Puerto Rico, and Hawaii—are known as "affiliated and represented associations." The Board of Directors is composed of one representative from each qualified affiliated association and fifty members-at-large. This board elects six members to serve with the six officers and the retiring president as an Executive Committee. This committee directs the national policy for work throughout the country.

The association had an individual membership of 3,539 in 1948, composed of physicians, public health workers, and interested laymen. The annual membership fee is $5.

Practically all the work of the national, state, and local tuberculosis associations is financed by the annual sale of Christmas Seals.

The story of the financial support of tuberculosis work in this country is the story of the Christmas Seal. It is an almost incredible story and has been well told elsewhere.[21] After a European origin and a limited private use in America in 1907, the Christmas Seal was issued by the American Red Cross from 1908 to 1910, then jointly by the Red Cross and the Association until

[20] Robert G. Paterson, "Antecedents of the National Tuberculosis Association," Historical Series 2, National Tuberculosis Association, New York, 1945.

[21] Leigh Mitchell Hodges, "The People against Tuberculosis—The Story of the Christmas Seal," National Tuberculosis Association, New York, 1942.

1920, and exclusively by the Association since that time. Its continued success, even in the face of the prophecy of those who administered it that it would, like some fad, lose its appeal, makes it by far the most successful money-raising method ever hit upon by any voluntary health agency.[22]

In 1908 there was raised by the penny Christmas Seal $135,000; in 1918 the amount raised was $2,500,000; in 1928 the sum of $5,465,738 was raised; in 1938 the amount raised was $5,239,525, and in 1948 the total amount was $20,153,476.49.

Five per cent of each year's sum goes to support the work of the National Tuberculosis Association, and 95 per cent remains for the support of state and local associations in the area from which the money is raised.

It is probable that more persons have participated in one year in this far-reaching humanitarian program for the control of a single disease than ever took part in any like philanthropic project conceived by man. And, if with each seal, there goes even something of the message that tuberculosis can be controlled, that it can be prevented, and that early cases can be cured, the educational implications of this wide participation in the annual Seal sale are enormous.[23]

The purpose of the tuberculosis movement may be expressed briefly, as follows:

1. To prevent and control mass infection from tuberculosis either by segregating the foci of infection or removing the contacts.

2. To discover, so far as possible, all cases of tuberculosis in each community, whether latent, potential, or active.

3. To provide adequate treatment for all types of cases with a view to restoring as many persons as possible to normal community life.

[22] Cavins, "National Health Agencies," p. 84.

[23] *Ibid.*, p. 85.

4. To create through popular education a health consciousness or health opinion in the community so that the support of the public for programs of tuberculosis control may be established.

5. To study the manifestations of tuberculosis in the individual and in the community in order to furnish the necessary knowledge on which sound programs may be built.

6. To organize community activity, local, state, and national for the furtherance of these aims.

The principal functions of the National Tuberculosis Association are education, organization, improvement of standards, cooperation, legislation, research, supplies, and information. The association has been a leader in the development of sanatoriums and hospitals, clinics, public health nursing, surveys of varying kinds, health education of the individual as well as in the schools and in the community, support of official health work (local, state, and national), and demonstrations. It has used all and developed many of the techniques in the field of health education of the individual, the school, and the community. It publishes the *American Review of Tuberculosis*, the leading monthly scientific journal in the world; the *Bulletin*, a monthly; annual transactions; *Tuberculosis Abstracts*, a monthly review for physicians; and numerous special publications.

A principle of organization adopted by the national association in the beginning of its work was that the problem of tuberculosis could be met best in the local area. In order to secure local organizations the national association adopted the *state* as its unit. By 1917 there was some sort of state organization in every state. The state associations in turn began creating the organization of local associations, first on a municipal basis and later on a county or district basis. Except for regional variations in New England and a few sparsely settled states, the *county* is today the basic unit of organization throughout the country. Of the 3,070 counties in the United

States there were in 1948 2,950 local tuberculosis organizations.[24]

The relationship between these types of organization is that the state association has wide latitude of autonomy within the broad principles contained in the "Authorized Forms of Tuberculosis Work" and the annual contract for the sale of Christmas Seals. The local associations are under the advisory supervision of their respective state associations, which in turn bear the same relationship to the national association.

A basic difficulty in the organization of social forces against tuberculosis, and indeed throughout most of the problems encountered in the public health movement, has been the accommodation of ideas involved in the terms *treatment* and *prevention.* The National Tuberculosis Association over the years has been successful in its efforts to meet the difficulty. In 1905 there was organized the American Sanatorium Association,[25] comprised of physicians engaged either in the private treatment of tuberculosis or in the institutional care of the disease. In 1912 the National Conference of Tuberculosis Secretaries was organized. It consisted of tuberculosis workers interested in the promotion of community resources for the prevention of the disease. Thus these two forces have been brought together under the national association.

Owing to the ideas widely prevalent at the time of the organization of the National Tuberculosis Association, the direction of efforts led toward: (1) the establishment of state and local governmental institutions for the care and treatment of tuberculosis; (2) the creation of clinics for the examination of patients; (3) education in the family in which tuberculosis was found through the tuberculosis visiting nurses; (4) the

[24] "Historical Directory of National State and Local Tuberculosis Associations in the United States," Historical Series 5, National Tuberculosis Association, New York, 1948.

[25] Lewis J. Moorman, "The American Sanatorium Association—A Brief Historical Sketch," Historical Series 3, National Tuberculosis Association, New York, 1947. The association is now known as the American Trudeau Society.

establishment of open-air schools and classes in the schools and in the community; (5) the organization of preventoria for children found in tuberculous homes; (6) the institution of health education in the schools and a complete change in the content and approach in hygiene teaching; and (7) the health education of the community through tuberculin testing and mass X-ray programs. Between 1904 and 1948, with increased knowledge, these objectives have undergone changes and some have even disappeared.

Thus the medical, economic, and social problems involved in the effort to control tuberculosis have led to an entirely new philosophy of the relationship between the individual and the community. This change can be noted in the gradual evolution outlined in the five eras in the public health movement.

Social Foundations. At the time that the promotional type of unofficial health organization came into the public health movement, there appeared a new type of organization known as the social foundation or community trust.[26] These have been defined as instruments for the contribution of private wealth to public purposes. The concept of the foundation is an American social invention. Up to 1900 only four or five such foundations had been established. By 1915 the number had grown to 23, and in 1944 the number listed totaled 505. They were created principally to advance education, health, research, and social welfare. In a study conducted by the Russell Sage Foundation in 1944, foundations created in the health field, which included medical research and medical education, ranked third among those devoted to education, social welfare, and health.

Between 1905 and 1948 these foundations have made many significant contributions to public health.

Some of these foundations are:

[26] Shelby M. Harrison, and F. Emerson Andrews, "American Foundations for Social Welfare," Russell Sage Foundation, New York, 1946. This work includes a bibliography.

1905—Milbank Memorial Fund (New York).
1907—Russell Sage Foundation (New York).
1908—Elizabeth McCormick Memorial Fund (Chicago).
1913—Rockefeller Foundation (New York).
1918—Commonwealth Fund (New York).
1919—Twentieth Century Fund (New York).
1925—American Foundation (Philadelphia).
1928—American Foundation for Mental Hygiene (New York).
1930—W. K. Kellogg Foundation (Battle Creek, Mich.).
1938—National Foundation for Infantile Paralysis (New York).
1941—Nutrition Foundation (New York).
1946—National Mental Health Foundation (Philadelphia).

These foundations have been created by gift or by will. As a rule they are incorporated under state law, although the Rockefeller Foundation was chartered by an Act of Congress. Foundations enjoy exemption from taxation. A large proportion of the expenditure of foundations is used for research, either under their own direction or through other organizations. Their services are in the fields of investigation, consultative service, training of personnel, and grants-in-aid for direct service (this includes grants in support of demonstrations). Some of the best known demonstrations follow: Framingham, Mass., Demonstration (1917–1923); Cattaraugus County, Syracuse, N.Y. (1923–1931); Bellevue-Yorkville District in the City of New York (1926–1934); Marion County, Ore., Child Health Demonstration (1925–1929); Mansfield, Ohio, Child Health Demonstration (1922–1925); and Fargo, N.D. (1923–1927).

Practically all these foundations issue annual reports, publish a regular journal on a monthly or quarterly basis, and engage in the publication of books bearing on public health problems, and a few promote work in specific fields of interest.

Milbank Memorial Fund. A brief description of the Mil-

bank Memorial Fund[27] is given here because it was one of the earliest to devote its efforts to public health. The Milbank Memorial Fund was established and endowed by the late Mrs. Elizabeth Milbank Anderson (1850–1921) as a memorial to her father and mother, Jeremiah and Elizabeth Lake Milbank. It was incorporated on April 3, 1905, under the Membership Corporation Law of the State of New York, as The Memorial Fund Association. The name was changed in 1921. The stated objects of the fund are "to improve the physical, mental and moral condition of humanity, and generally to advance charitable and benevolent objects."[28]

The fund has assisted official and unofficial agencies and institutions in public health and medicine, education, social welfare, and research. Emphasis has been given to activities which are preventive rather than palliative and to the improvement of administrative procedures in public health. Since 1922 the fund has cooperated with demonstrations in Cattaraugus County (a rural program, 1923–1931); Syracuse (an urban program, 1923–1931); and the Bellevue-Yorkville District (a metropolitan program, 1926–1934) of the City of New York in the New York Health Demonstration Project. It has supported research in the fields of population trends, specific diseases, and nutrition. The results of these research projects have been published usually in the *Milbank Memorial Fund Quarterly*, which has been published since April, 1923.

While the total financial resources of the fund are not large as compared with a number of other foundations, the decisions as to the uses of the money available each year have had widespread influence in revealing problems, facts, and procedures and in establishing methods of meeting problems. The fund expended $11,550,093.88 in the period 1905–1939 inclusive, divided as follows:

[27] My thanks are due Dr. Frank G. Boudreau, Executive Director, Milbank Memorial Fund, for careful examination of this description.

[28] Milbank Memorial Fund, "Thirty-five Years in Review, 1905–1940," New York, 1940.

Health	$7,384,498.94
Social welfare	1,647,378.89
Research	1,424,131.45
Education	1,094,084.60
Total	$11,550,093.88

The development of the program of the fund began with the first grant to the Legal Aid Society of New York. In 1913 the New York Association for the Improvement of the Condition of the Poor received funds to establish a Department of Social Welfare. In 1915 the National Committee on Mental Hygiene was able to advance its work in mental hygiene. In 1916–1921 the fund helped to establish health centers in New York. In 1922 money was made available for the conduct of annual conferences on current public health problems. In 1923 funds were made available for the establishment of the three health demonstrations—Cattaraugus County, Syracuse, and Bellevue-Yorkville. In 1928 the Division of Research in the fund was created. From 1927–1932 assistance was given to the Committee on the Costs of Medical Care.

The result obtained in the Bellevue-Yorkville demonstration constituted a decisive argument for district health centers in the larger cities. The Committee on Neighborhood Health Development was established in 1929 by the New York City Health Commisssioner to consider the whole health center program and to advise and assist him in the development of local health centers. The fund has been the principal source of support for this committee since its organization.

Beginning in 1937 the main emphasis of the fund has been on nutrition and on the hygiene of housing. It has made important contributions in the fields of population problems, regional health planning, maternal and child health, school health, tuberculosis, venereal diseases, and health problems of adult life.

Other Types of Unofficial Health Organizations. In addition to the three types of unofficial health organizations just

described, there are several other types of organization that make a distinct contribution to public-health education. An example of these organizations is the American National Red Cross.

The American National Red Cross. The American National Red Cross was organized July, 1881, as the Association of the American Red Cross, reincorporated April 17, 1893, changed its name to the American National Red Cross in 1900, and was reincorporated by Act of Congress on January 5, 1905. Its purposes as stated in the charter are to furnish volunteer aid to the sick and wounded armies in time of war; to perform all duties with which the national society of each nation acceding to the Treaty of Geneva (established August 22, 1864, and signed by the United States in 1882) is charged; to act in matters of voluntary relief; and to serve in accord with military and naval authorities as a medium of communication between the people of the United States and their Army and Navy. It is further charged with providing a system of national and international relief to mitigate the suffering caused by pestilence, famine, fire, flood, and other great national calamities and to devise measures for their prevention.[29]

Administration of the affairs of the American Red Cross is vested in the Board of Governors by the provisions of the Congressional charter, amended in 1947. This board consists of fifty members. The board appoints from its own membership an Executive Committee of nine members. The President of the United States is national honorary chairman of the organization.

The work of the American Red Cross is administered from a national office and five branch headquarters. The national headquarters is at Washington, D.C. Area offices are in Alexandria, Va., Atlanta, Ga., St. Louis, Mo., and San Francisco, Calif. The American Red Cross does not maintain state organizations but does have several field representatives assigned

[29] Thanks are due the American Red Cross for careful examination of this description.

to each state, with state-relations officers stationed in many of the capitals. The local units are called "chapters," of which there are 3,746. In most instances these chapters have jurisdiction in and are organized on a county basis. The membership of the American Red Cross for 1947–1948 numbered 18,110,000 adults, in addition to 19,414,000 junior members.

Activities of the American Red Cross embrace:

1. Disaster relief and rehabilitation. Disaster *relief* meets basic needs of food, clothing, shelter, and medical-nursing care of disaster-affected families during the emergency period following catastrophe. Disaster *rehabilitation* helps families without other resources toward normal living status, provides assistance in rebuilding and repairing homes, supplies household furnishings, provides basic farm equipment and livestock, and re-establishes one-man businesses.
2. Services to armed forces and veterans.
   a. To the armed forces: consultation and guidance; emergency communications; financial assistance in emergency on basis of need; verification of situations enabling authorities to decide whether or not to grant emergency leaves; information regarding government benefits and assistance in applying for such benefits; supplementary recreation assistance for military personnel and in military hospitals; social case-work services, medically approved recreation, and distribution of comfort articles.
   b. To disabled veterans: emergency financial assistance; help in preparing and presenting claims for government benefits; assistance with welfare and rehabilitation for the hospitalized; counsel and guidance in personal and family problems; and referral to other community agencies for specialized services.
3. Health and safety services. Administers the national blood program for donors at established regional centers throughout the country to supply hospital needs; provides instruction in home nursing and nurse's-aide classes; enrolls nurses for disaster, epidemic, and other commu-

nity service and emergencies; provides food and nutrition consultation service; provides instruction in first aid, accident prevention, and lifesaving; and renders first-aid service on highways.

4. Volunteer services. Provides hospitals, clinics, and other institutions with chapter volunteers trained in arts and skills, entertainment and instruction, production and supply, canteen, motor, Gray Lady, nurse's-aide, social-welfare, and staff-aide services. (These volunteers are in addition to those who serve in other categories listed.)
5. School and college activities.
   a. Junior Red Cross: community service projects for children in school; international school correspondence album exchange; school art exchange; school music programs; publications, such as the *Junior Red Cross News* and *Junior Red Cross Journal;* and educational gift boxes and bulk shipments of school and health supplies through the National Children's Fund to war-devastated countries.
   b. College Activities: college students' volunteer service in the total Red Cross program and publication of *The Record.*
6. International activities. Provides liaison with the International Red Cross Committee (Geneva) and League of Red Cross Societies (Paris); provides international disaster service; conducts insular chapter activities; and furnishes material and advisory help to other Red Cross agencies, including study visits for foreign Red Cross personnel.
7. Public relations, information and fund raising. Provides year-round interpretation of the American National Red Cross activities and expenditures to the supporting public via all general publicity mediums and through Red Cross publicity and promotional materials issued via chapters; issues an official publication, the monthly *Courier;* prints an annual report; conducts an annual convention of membership; and conducts an annual fund campaign.

The American National Red Cross has quasi-governmental status. Its books are audited by the Department of the Army. The organization's programs are carried out by 6,690 paid personnel (1947–1948) and approximately 2 million volunteer workers.

Social and Educational Agencies. Both the Young Men's and Young Women's Christian Associations have for many years rendered a national health service through their divisions of physical and health education. Progressive health programs are approved by the national boards of these organizations.

For youth of slightly earlier ages the Boy Scouts, Girl Scouts, 4-H clubs, National Recreation Association, and similar organizations provide definite programs for the promotion and protection of health.

The General Federation of Women's Clubs and the National Congress of Parents and Teachers are types of the larger national organizations having divisions and programs in health.

In education the American Student Health Association and the Department of Health, Physical Education and Recreation of the National Education Association may be cited as agencies rendering a broad health service in schools and colleges.

Less well-organized but still outstanding contributions to national health promotion are the services rendered by a long list of fraternal organizations, international and national service clubs, labor organizations, and chambers of commerce.

Commercial Organizations. Commercial organizations include corporations which carry on health work among their own employees and in industrial areas for the entire community. Examples of these organizations are insurance companies which publish educational literature and films, provide health services to policyholders, and support demonstrations and activities of other organizations; and trade associations

which are composed of several industries in a specific field and carry on popular education, research, and other activities in public health relating to their special interests.[30]

The National Health Council. In 1910 Mary E. Richmond prepared a pamphlet on "The Inter-Relation of Social Movements with Information about Sixty-Seven Organizations." This was published by the Charity Organization Department of the Russell Sage Foundation in New York. She classified the organizations into ten groups. Health was Group IV. In 1900 health led the list, with fourteen organizations out of sixty-seven organized between 1840 and 1900. This was probably the first attempt to secure an over-all national picture of the health and social movements in the United States.

In an effort to bring some order in the rapid development of interest in health, as exemplified by this vast network of organizations, discussions were initiated as early as 1913 on the need for a national clearinghouse of information. In that year a study[31] was made, under the auspices of the Council on Health and Public Instruction of the American Medical Association, of forty-five organizations, twenty-three of which were considered to be national in scope and devoted primarily to public health.

This study was reported to a special meeting of the interested foundations and organizations during the annual meeting

[30] "Social Work Year Book," Vol. 1, 1929, p. 354.

[31] Selskar M. Gunn, "The Present Condition of Public Health Organization in the United States," American Medical Association, May 15, 1915 (out of print).

F. B. Dresslar, "Typical Health-teaching Agencies of the United States," Bureau of Education, Department of Interior, Washington, D.C., 1913. This was a reprint from the Report of the Commissioner of Education (Vol. 1, Chap. XI, 1912) for the year ended June 30, 1912. National, state, and local organizations were listed. The official, promotional, foundational, social, educational, and commercial organizations existing at the time were presented without any definite plan of classification.

of the American Public Health Association in 1913. A continuation committee collected further data, and in 1919 another conference on the subject was held. This was followed by a resurvey under a special committee financed by the American Red Cross.[32] Finally, a meeting was arranged in 1920 at which formal steps were taken to create the National Health Council.

The council began to function officially on January 1, 1921, and was incorporated under the laws of the State of New York in 1932. There are four types of membership in the National Health Council.

1. *Individuals* (60 delegates).
2. *Active* (17). American Cancer Society, American Epilepsy League, American Eugenics Society, American Hearing Society, American Heart Association, American Hospital Association, American Public Health Association, American National Red Cross, American School Hygiene Association, Association of State and Territorial Health Officers, Maternity Center Association, National Committee for Mental Hygiene, National Committee of Health Council Executives, National Organization for Public Health Nursing, National Safety Council, National Society for the Prevention of Blindness, and National Tuberculosis Association.
3. *Advisory* (2). U.S. Children's Bureau and U.S. Public Health Service.
4. *Associate* (4). American Association of Social Workers, American Diabetes Association, American Nurses Association, and Planned Parenthood Federation of America.

The general activities of the council consist of the coordinating and correlating the operation of its constituent members and carrying on certain joint or special projects in their interests. From time to time joint projects have been established, such as conference dates, health examinations, health-

[32] Genevieve Poyneer Hendricks, "Handbook of Social Resources of the United States," American Red Cross, Washington, D.C., 1921.

poster lists, a monthly periodical, specially prepared bibliographies, and information service regarding motion-picture health films. The common services have been administered through a service department and include office rental service, National Health Library, shipping, bookkeeping, telephone, multigraphing, letter service, proofreading, film distribution, purchase of printing, and other service activities, the cost of which may be prorated according to use by the member agencies in the council. It publishes "Health Articles of the Week," a weekly index to literature on public health in more than 500 periodicals. The National Health Series, a set of twenty popular health books, was edited by the council and published by Funk & Wagnalls Company.

The National Social Welfare Assembly. In December, 1945, the National Social Work Council (1922) was reorganized into the National Social Welfare Assembly.[33] The purposes of the assembly are to provide leadership and facilities for individual members to plan and act together in matters of common interest, as well as to provide a means of consultation and conference on social-welfare needs and problems. Provision was made for lay as well as professional representation and participation, with local and national representation. Steps are taken to bring about close coordination of the several national interagency bodies, such as the National Health Council, National Education-Recreation Council, Social Case Work Council of National Agencies, National Publicity Council for Health and Welfare Services, Associated Youth Serving Organizations, and the National Committee on Service to Veterans.

Types of cooperative effort are discussions of common

[33] Annual Report of Director, National Social Welfare Assembly, New York, 1947.

Ray Johns, "The Cooperative Process among National Social Agencies," Association Press, New York, 1946.

The Woman's Foundation, Committee of Consultants on Community Reorganization, "The Road to Community Reorganization," New York, 1945.

problems, joint interpretation and consultation with Federal officials, joint fund raising, agreements between agencies, experimental interagency field services, and joint consideration of personnel matters. In October, 1948, there were fifty-two affiliate organizations in the assembly. The assembly is financed in part from its affiliate organizations and community chests and in part by foundations and individuals.

Suggested Reading

"Social Work Year Book," 1929–1947, Russell Sage Foundation, New York.

Emerson, Kendall, "National Non-official Health Services," in Haven Emerson, "Administrative Medicine," Thomas Nelson & Sons, New York, 1941.

Cavins, Harold M., "National Health Agencies, A Survey with Especial Reference to Voluntary Associations, Including a Detailed Directory of Major Health Organizations," Public Affairs Press, Washington, D.C., 1945.

Harrison, Shelby M., and F. Emerson Andrews, "American Foundations for Social Welfare," Russell Sage Foundation, New York, 1946.

Johns, Ray, "The Cooperative Process among National Social Agencies," Association Press, New York, 1946.

CHAPTER 16

OFFICIAL PUBLIC HEALTH ORGANIZATIONS

The first sanitary legislation in America apparently was an enactment in March of 1647 or 1648 by the General Court of the Massachusetts Bay Colony. This enactment provided for a maritime quarantine against ships from the West Indies, where raged one of the periodic epidemics of yellow fever.[1] Temporary quarantine laws were also adopted by Connecticut in 1663 and 1679.

Much of the early sanitary legislation in the American colonies was directed against smallpox, a widespread disease in the seventeenth and eighteenth centuries. Boston, Salem, and Plymouth adopted local regulations against smallpox in 1678 and provided for disinfection. They forbade the selling of goods made by the infected family or the exposure of any kind of infected goods and required contacts to stay at home. In 1761 the Massachusetts Bay Colony provided for the "impressment" of houses for the isolation and care of smallpox. In 1742 the Massachusetts Bay Colony passed a law for the prevention of smallpox and other contagious sickness. In 1743 provision was made for a "pesthouse."

The methods employed at this time to control smallpox were isolation, quarantine, and disinfection.

[1] John M. Toner, "Boards of Health in the United States," American Public Health Association, *Public Health Reports and Papers*, Vol. 1, 1873, pp. 499–521.

Charles V. Chapin, "History of State and Municipal Control of Disease," in M. P. Ravenel (ed.), "A Half Century of Public Health," American Public Health Association, New York, 1921, pp. 133–160.

H. S. Mustard, "Government in Public Health," Commonwealth Fund, Division of Publication, New York, 1945.

The early records of legislation for the control of nuisances indicate a law in Massachusetts in 1647 against pollution of Boston Harbor. Philadelphia passed acts against nuisances in 1712.

During the seventeenth and eighteenth centuries there was probably no permanent organization designed to promote the public health and no officials who gave more than a small portion of their time to such matters. Whenever outbreaks of disease occurred temporary committees or officers were appointed, or men voluntarily grouped themselves together to meet the emergency. The first local boards of health were established in Petersburg, Va., in 1780, and in New York in 1796.

The first comprehensive state enactment for the establishment of a local health department was that of June 22, 1797, in Massachusetts. A board of health was organized in Newburyport in 1797, and Boston established a board of health in 1799, with Paul Revere at its head. However, the growth of local health organization was slow. A report, covering considerably over one hundred principal towns, made in 1873 gave only five as having established a board between 1800 and 1830, and by 1873 there was a total of thirty-seven cities with local organizations. At present there is in every state some legal provision for local health organization, although the effectiveness of such organization varies widely throughout the country.

Local Government. A local health department is one organized by law to serve a political subdivision of a state, such as a county, township, city, town, village, or borough, or a group of communities or counties. These political subdivisions have a different relationship to the state than does the state to the Federal government. Whereas the United States may exercise only those powers granted to it by the people of the states, as expressed in the Federal Constitution, local governments not only have ceded no powers to the state, but they are purely creatures of legislative enactment, possessing only

those powers actually conferred upon them by the state either through constitutions, statutes, or charters. A political subdivision of a state may, therefore, exercise only those powers which are granted to it by the state, which are incidental to its creation or organization, or which can be reasonably implied from statutory authority.

State legislatures have given extensive powers to municipal corporations,[2] and in recent years have also bestowed upon them an increasing measure of home rule. Other political subdivisions of the state are likewise given wide authority, although it is usually somewhat less extensive than that of municipal corporations. These agencies are, however, always subject (within certain limitations) to the will of the legislature, and they are also subject to reasonable control by the executive and judicial branches of the state government.

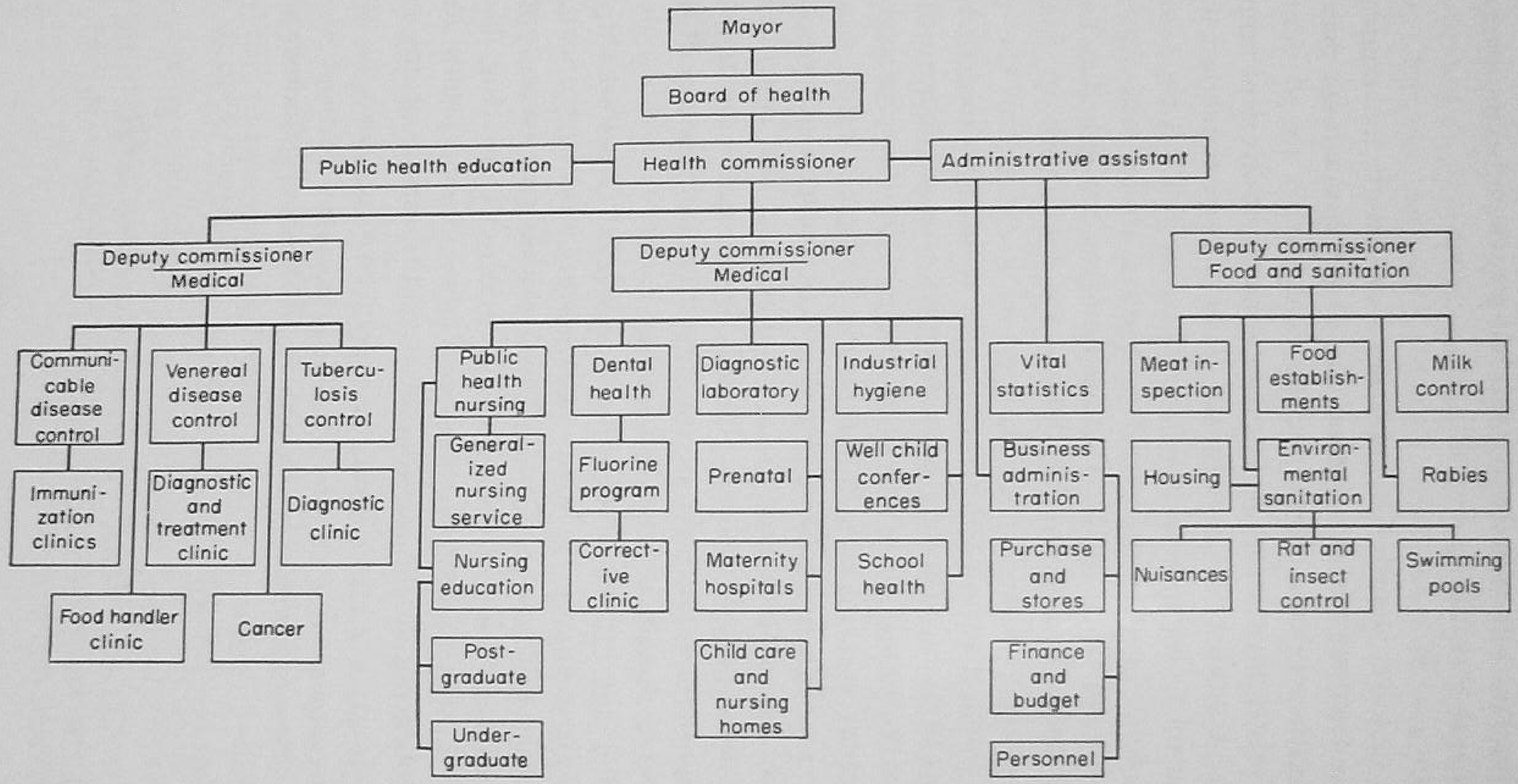
The significance of political subdivisions and local governments varies in the different states. In all states municipal corporations, such as cities of various classes and incorporated towns, are important units of government. Each municipal corporation usually has a health department, since such a department is an obvious necessity for the protection of the public health in urban communities.

There are three types of local rural government in the United States. In New England and some other states the town is important; in the South the county assumes importance; in many other states, such as New York, Pennsylvania, and Ohio, both the county and the town or township are important units of government. Local health departments outside cities, therefore, may be organized in towns or in counties or in both.

In many states, local health departments of certain types are distinct political agencies of the state, created by legislative authority and endowed with special powers. In most cases, however, local health departments are divisions of local gov-

[2] "Municipal Health Department Practice for the Year 1920," U.S. Public Health Service, Washington, D.C., *Bulletin* 136, 1923; *ibid.*, *Bulletin* 164, 1926.

CHART VIII. ORGANIZATION OF THE DEPARTMENT OF HEALTH, COLUMBUS, OHIO



ernment, subordinate to them but possessing some special and unique powers.

County Health Organization. Although the county has been recognized as a logical unit of government for necessary health services, county health departments are of comparatively recent origin. The first county health department in the United States is reported to have been organized in Jefferson County, Ky., in 1908. On June 1, 1911, the Guilford County health department in North Carolina was organized, while on July 1, 1911, a similar unit was established in Yakima County, Wash., and a fourth was established in Robeson County, N.C.[3]

Since that time the growth of the county health department has been rapid owing to stimulation of state departments of health, unofficial health organizations, the Rockefeller Foundation, and the U.S. Public Health Service.

The development of county health departments was due in the case of Yakima County, Wash., to the typhoid-fever studies of the U.S. Public Health Service and in the case of the Southern states to the program of study and control of hookworm disease by the Rockefeller Sanitary Commission. In Ohio the influenza epidemic of 1918–1919 enabled the State Department of Health to secure legislation to reduce 2,150 local health districts to 197 by creating two basic types of local health units: (1) a municipal district embracing all cities of 5,000 population or over; and (2) a general health district embracing all the territory in a county outside of any cities.

[3] John A. Ferrell and Pauline A. Mead, "History of County Health Organizations in the United States, 1908–1933," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 222, 1936.

J. W. Mountain, *et al.*, "Experience of the Health Department in 811 Counties, 1908–1934," *ibid.*, *Bulletin* 230, 1936.

L. L. Lumsden, "Extent of Rural Health Service in the United States," *Public Health Reports*, beginning November, 1921, and continuing, Reprints 708; 771; 833; 921; 1010; 1079; 1155; 1228; 1284; 1372; 1509; 1597; 1661.

District Health Organization. Experience in dealing with the county as the local health unit has shown that many of the counties throughout the country are not suitable either in population or in taxable wealth to support the modern public health program. There has developed a trend in a number of states toward district units—either county-city or county-county combinations. In the larger metropolitan cities there has been an effort to decentralize public health administration by the establishment of district organization.

Whatever type of organization may be created, there is agreement upon the basic types of personnel and activities that are required for proper protection of the community health.[4]

In 1942 a subcommittee on Local Health Units of the Committee on Administrative Practice of the American Public Health Association was authorized. This committee prepared a report[5] covering a detailed analysis, state by state, of the 3,070 counties in the United States, on existing public health services. It then proposed 1,197 administrative units, each approximating a total population of 50,000 or more inhabitants. A basic minimum program of services and necessary personnel was outlined at a cost of approximately $1 per capita. This minimum program of services included vital statistics, control of communicable diseases, environmental sanitation, public health laboratory services, hygiene of maternity, infancy, and childhood, and health education.

This proposal received the approval of the House of Dele-

[4] Ira V. Hiscock, "District Health Administration—A Study of Organization and Planning," Science Press Printing Company, Lancaster, Pa., 1936.

[5] Haven Emerson and Martha Luginbuhl, "Local Health Units for the Nation," Commonwealth Fund, Division of Publication, New York, 1945; "The National Conference on Local Health Units," University of Michigan, Ann Arbor, Mich., Supplement to the *American Journal of Public Health*, January, 1947; Haven Emerson, "The Indispensable Local Health Department," Proceedings, The National Conference on Local Health Units, Princeton, N.J., Sept. 8–10, 1947, American Public Health Association, New York, 1947, pp. 1–6.

"The Local Health Unit Story," Federal Security Agency, U.S. Public Health Service, States Relations Division, Washington, D.C., 1948.

gates of the American Medical Association on June 10, 1942, the governing council of the American Public Health Association on October 29, 1942, and the Conference of State and Provincial Health Authorities of North America on March 22, 1944. On February 20, 1948, Senator Saltonstall of Massachusetts introduced a "bill to assist the states in the development and maintenance of local public health units and for other purposes."[6] It did not pass.

State Health Organization. While it is generally accepted that the constitutional responsibility for the health of the people resides in the state, the state was content for many years to permit the exercise of this responsibility by local units of government. Historically, it was first the city, then the villages and townships, and finally the county which had to deal with the mass health problems of the community. The survey conducted by Lemuel Shattuck in Massachusetts in 1849 and recorded in the classic report of 1850 is marked as the point at which the duty of the state in health matters began to be recognized.

However, nothing was done with the recommendations until twenty years later, when Massachusetts passed an act creating the first state board of health in the United States. This was in 1869. Other states followed this lead, so that by 1879 eighteen states had enacted such laws, by 1900 twenty more states joined the ranks, and by 1913 every state and territory had established some form of state health organization.[7]

[6] S. 2189, 80th Cong., 2d Session, Local Public Health Services Act of 1948.

"Health Service Areas," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 292, 1945.

[7] Henry I. Bowditch, "Public Hygiene in America," Little, Brown & Company, Boston, 1877.

S. W. Abbott, "Past and Present Conditions of Public Hygiene in the United States," Boston, 1900.

Chapin, *op. cit.*, pp. 155–159; "A Report on State Public Health Work Based on a Survey of State Boards of Health," American Medical Association, Chicago, 1915.

Joseph W. Mountain and Evelyn Flook, "Distribution of Health

The completeness of these organizations and the extent and adequacy of their functions varied as greatly as the geography, industry, and population of the states themselves.

The conception of a state board of health[8] set forth in the Massachusetts law was that its chief function should be the investigation of the causes of disease and the giving of advice to the people and, especially, to the legislature and to the local units of government. This continued to be the ruling idea until in 1913 New York State separated the administrative functions from the traditional legislative and judicial functions by creating a Public Health Council and a State Health Commissioner.[9] A number of states have followed this pattern.[10] There are three distinct parts to the official state health agency: (1) the policy-forming and/or advisory body; (2) the executive officer; and (3) the state health department. The state health department is the administrative branch of the organization. It is divided into bureaus, divisions, and units or services—each headed by a chief or a director who is responsible for the administration of a specific program. Chart IX gives the general relationship of the various parts of a state health organization.

Services in the Structure of State Government," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 184 (3d ed.), 1943 (1st ed., 1929; 2d ed., 1932).

[8] There are a number of names used interchangeably—the State Board of Health, State Committee of Public Health, State Health Department. Mountain and Flook in the latest study (*op. cit.*) use the term "State Board of Health."

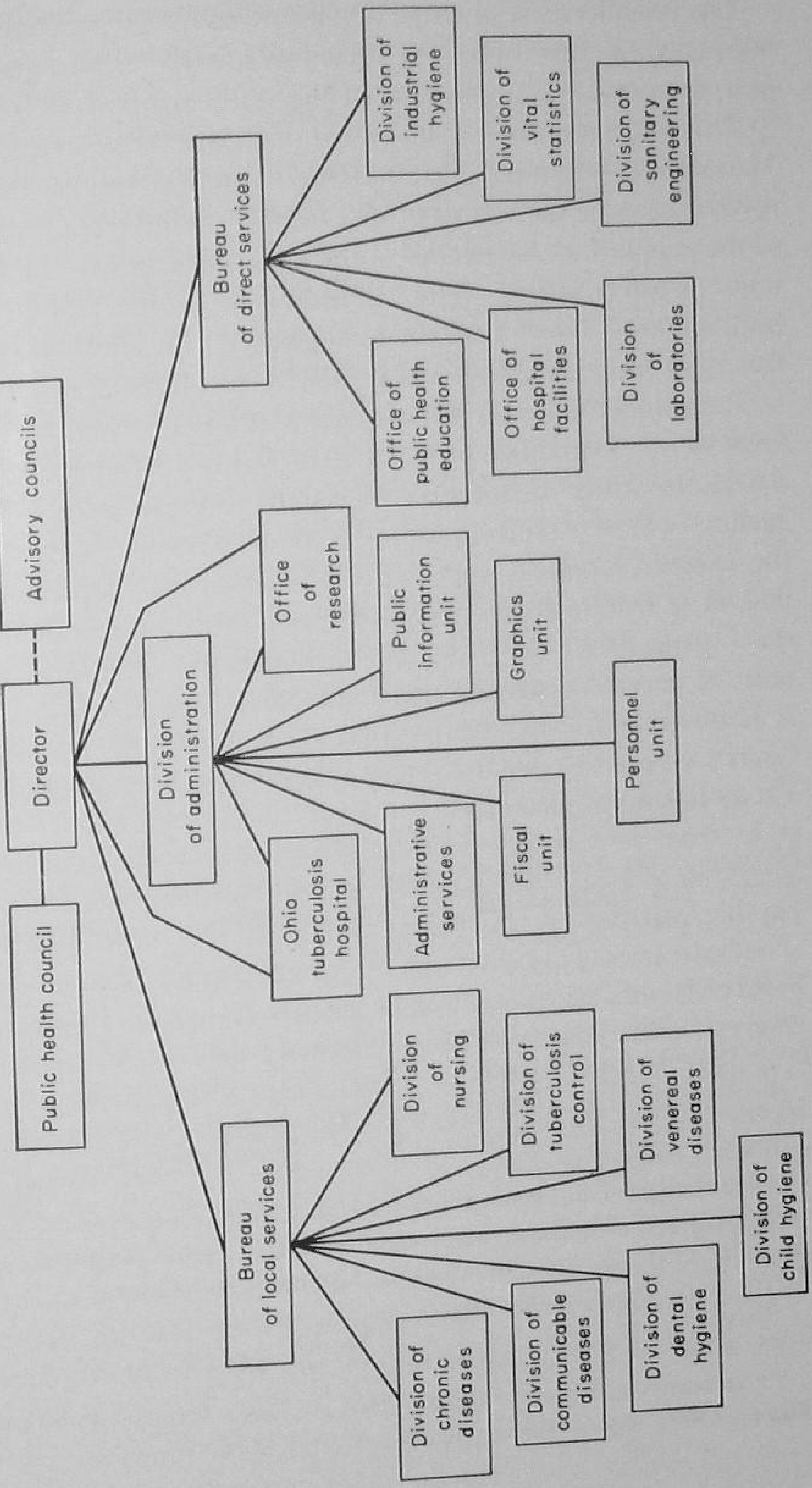
R. G. Paterson, "Historical Directory of State Departments of Health in the United States of America," Ohio Public Health Association, Columbus, 1939.

[9] Here again a number of titles are used interchangeably—Secretary, Executive Secretary, State Health Officer, State Health Commissioner, State Director of Health. Mountain and Flook (*op. cit.*) use the term "State health officer."

"Directory of State and Insular Health Authority," issued annually by the U.S. Public Health Service since 1912.

[10] Connecticut, Illinois, Maine, Massachusetts, Michigan, North Dakota, Ohio, Rhode Island, Tennessee, and West Virginia.

CHART IX. ORGANIZATION OF THE OHIO DEPARTMENT OF HEALTH



The state in general retains certain supervisory authority and exercises certain functions which by their nature are conducted less readily by the smaller local units. These functions cover vital statistics, the provision of consultation and epidemiological service for the control of communicable diseases (including tuberculosis and the venereal diseases), maintenance of public health laboratory service, supervision of public water supplies and of stream pollution, general control over milk supplies, health education, supervision of maternity, infant, and school hygiene, and public health nursing.

The extent to which certain functions are carried out by local health departments or by central state agencies varies among the states. The policy of making grants-in-aid to local health work is becoming generally established in all except a few states. Under this plan a substantial proportion of the budget of county health departments is borne by Federal and state funds, and supervision is maintained over the qualifications of personnel and standards of service.

While it has been shown[11] that great dissimilarity characterizes state health department organizations, there is discernible a certain uniformity in their basic functions. These functions relate to a policy-forming or advisory body—executive direction and an administrative department composed of several bureaus or divisions dealing with particular health matters. The basic bureaus or divisions are administration, sanitary engineering, vital statistics, public health laboratory, epidemiology, health education, and maternity and child hygiene. To these bureaus or divisions there are rapidly being added public health nursing, tuberculosis control, venereal-disease control, and local health administration. Further, there are evidences of additional areas in the public health functions being reflected in bureaus or divisions for dental hygiene, industrial hygiene, mental hygiene, and cancer control.

On October 9, 1940, the American Public Health Association made an official statement of the "Desirable Minimum

[11] Mountain and Flook, *op. cit.*, Chap. X, "State Health Department Organization," pp. 11–16.

Functions and Organization Principles for State Health Activities." The state health functions were listed as follows:

1. Study of state health problems and planning for their solution as may be necessary.

2. Coordination and technical supervision of local health activities.

3. Financial aid to local health departments as required.

4. Enactment of those regulations dealing with sanitation, disease control, and public health which have the force of law throughout the state.

5. Establishment and enforcement of minimum standards of performance of work of health departments, particularly in communities receiving state aid for public health.

6. Maintenance of a central laboratory, and where necessary branch laboratories, for the standard functions of diagnostic, sanitary, and chemical examinations; for production or procurement of therapeutic and prophylactic preparations and their free distribution for public health purposes; for the establishment of standards for the conduct of diagnostic laboratories throughout the state; and for laboratory research into the causes and means of control of preventable diseases.

7. Collection, tabulation, and publication of vital statistics for each important political or health administrative unit of the state and for the state as a whole.

8. Collection and distribution of information concerning preventable diseases throughout the state.

9. Maintenance of safe quality of water supplies and controlling the character of the disposal of human waste for all communities of the state.

10. Establishment and enforcement of minimum sanitary standards for milk supplies.

11. Provision for services to aid industry in the study and control of health hazards due to occupation.

12. Prescription of qualifications for certain public health personnel.

13. Formulation of plans in cooperation with other appro-

priate agencies for the prompt mobilization of services to meet health needs.

The association further recommended that local authorities should assume the primary responsibility for carrying out this program, because the major part of direct service to people could be most efficiently and economically rendered on a community basis. While public health is a primary responsibility of each local community, it is nevertheless indispensable that authority should be vested in the state health department to make certain for the state as a whole that the health in communities where local control is ineffective will not be jeopardized by the inertia, incompetence, or neglect of the local government of other communities.

U.S. Public Health Service. As has been indicated, the *state is the sovereign power* in public health organization and administration. The Constitution of the United States does not specifically delegate any public health powers to the Federal government. Those Federal laws that have been enacted relating to public health have been passed under the general constitutional provisions which relate to (1) the regulation of commerce with foreign nations and among the several states; (2) the levying of taxes and the promotion of the general welfare; and (3) the power of the President (with the consent of the Senate) to make treaties with foreign powers.[12]

The organization now known as the U.S. Public Health Service[13] had its origin in the Marine Hospital Service which was established by an act of Congress approved July 16, 1798. This act authorized the President to nominate and appoint medical officers to furnish medical treatment and hospital care for sick and disabled seamen at such ports and other places in

[12] James A. Tobey, "Public Health Law," Commonwealth Fund, Division of Publication, New York, 3d ed., 1947.

[13] My thanks are due the U.S. Public Health Service for their careful examination of this statement.

the United States as presented needs for services of this nature. It was provided that this care might be given either in hospitals maintained by the United States or in civilian institutions with which contracts might be negotiated.

A tax of 20 cents per month, collected by collectors of customs of the Treasury Department, on all seamen employed on American vessels engaged in foreign and coastwise trade was the means prescribed by the early legislators for financing this hospital service.

The first treatment furnished seamen by the Marine Hospital Service was given in Boston early in 1799. The first marine hospital operated under the authority of the act of 1798, and located at Norfolk, Va., was purchased from the State of Virginia in 1801. In 1803 a marine hospital was built at Boston. In the years following, other marine hospitals were established along the Atlantic seaboard, along the Mississippi and Ohio rivers, and on the Great Lakes.

In caring for the sick and disabled seamen in American ports, the medical officers appointed to serve in these early marine hospitals necessarily became familiar with the diseases brought into the country from abroad. It frequently happened that these medical officers were the first physicians to diagnose such diseases as cholera, yellow fever, and smallpox which threatened the health of the populations at the ports of entry. This was particularly true in Southern ports, then exposed to frequent dangers from outbreaks of yellow fever.

During epidemics in the early days, the Marine Hospital Service frequently received Presidential authority to aid local health authorities in relief and control measures. The marine hospitals, and some of the medical personnel as well, were used by both the North and the South during the Civil War for the care of the military forces.

Gradually Congress began to extend the functions of the Marine Hospital Service and to make of that organization a Federal health service. In 1878 the service was given authority to impose maritime quarantine to prevent the entry of disease into the United States from abroad. Those powers re-

lated especially to yellow fever and cholera. It was not until 1890 that specific authority was given to impose quarantines to prevent interstate spread of disease, and then the authority was limited to the prevention of cholera, yellow fever, smallpox, and plague. In 1893 this authority was extended to cover all infectious and contagious diseases, and provision was made for cooperation with state and municipal health agencies to prevent the introduction and interstate spread of such diseases.

Congress soon recognized the value of military discipline in an organization which had to combat epidemic diseases, and in 1889 it authorized the organization of the Marine Hospital Service along military lines,[14] with officers of the Medical Department of the Army in charge.

In 1902 the name of the organization was changed to The Public Health and Marine Hospital Service, and in 1912 this name was changed to United States Public Health Service.

While the public health functions of the service had their inception in the prevention of the introduction and spread of quarantinable diseases, the development of these functions was largely the result of changes in public opinion. These changes came about through increased knowledge and the interpretation of that knowledge in terms of its value to the individual. Investigative functions began with inquiries into the causes of such diseases as yellow fever and cholera. In 1901 Congress authorized the building of a hygienic laboratory for the investigation of infectious and contagious diseases, and in 1912 authorization for such research was extended to include all diseases of man and conditions influencing their propagation and spread.

Physical and mental examination of all aliens entering the United States was instituted in 1917, and medical officers of the service were sent to foreign countries to make these ex-

[14] The Surgeons General of the U.S. Public Health Service have been: Dr. J. M. Woodward, 1871–1879; Dr. J. B. Hamilton, 1879–1891; Dr. Walter Wyman, 1891–1911; Dr. Rupert Blue, 1912–1920; Dr. H. S. Cummings, 1920–1936; Dr. Thomas Parran, 1936–1948; Dr. Leonard A. Scheele, 1948 to date.

aminations of emigrants. In this year the National Leprosarium at Carville, La., was also established. In 1918 a Venereal Disease Control Division was established with funds to aid the states. In 1929 mental hygiene was added to the functions of the service, together with the medical care of Federal prisoners and narcotic addicts. These fields of work have proved so important and profitable in results that in 1930 Congress increased the facilities for research, provided for the acceptance of unconditional gifts and bequests for the study of the fundamental problems of disease, authorized an appropriation of $750,000 for additional buildings and equipment, and changed the name of the Hygienic Laboratory to the National Institute of Health. Construction was begun in 1938 on a series of new buildings to house the National Institute of Health at Bethesda, Md.

The health provisions of the Social Security Act, approved August 14, 1935, provided for expansion of cooperative activities with the states and authorized increased appropriations for the investigation of disease and problems of sanitation. Title VI, which was administered by the Public Health Service, included substantial grants-in-aid to all the states for the purpose of strengthening the state and local health departments.

Means for renewing the attack upon cancer were provided by the National Cancer Institute Act signed on August 3, 1937. The National Cancer Institute is administered as a division of the National Institute of Health. Grants-in-aid have been awarded to universities and research institutions to be used in carrying on investigations in regard to cancer. Research fellows and trainees as cancer specialists have been appointed, and efforts have been made to cooperate with the state health agencies in cancer control activities.

The Venereal Disease Control Act, signed on May 24, 1938, established the movement to control syphilis and gonorrhea in the United States on a permanent, national basis. Funds have been available for assisting states and political subdivisions of the states in establishing and maintaining adequate

measures for the prevention, treatment, and control of the venereal diseases and for the purposes of making studies, investigations, and demonstrations to develop more effective measures including the training of personnel.

Under the Reorganization Act of 1939 and the President's Reorganization Plan I, effective July 1, 1939, the U.S. Public Health Service was removed from the Treasury Department and placed in the Federal Security Agency under the direction and supervision of the Federal Security Administrator, but no other changes in the organization of the service occurred at that time.

Under the provision of an act of June 15, 1943, the Public Health Service was authorized to administer a program of nurse education.

In 1944 Congress enacted the Public Health Law,[15] which provided for a complete reorganization and consolidation of the service, with a codification of national laws relating to public health. Under this act the U.S. Public Health Service remained in the Federal Security Agency under the supervision and direction of the Administrator. Under the act the service consists of: (1) the Office of the Surgeon General; (2) the National Institutes of Health;[16] (3) the Bureau of Medical Services; and (4) the Bureau of State Services. The act provided for greater assistance to states in establishing and maintaining adequate public health services, development of coordinated research into causes and prevention of all diseases, establishment of a national tuberculosis-control program, and expansion of the commissioned corps of the service to include scientific personnel and nurses. The Surgeon General is appointed from the regular corps of the service by the President, with the advice and consent of the Senate, for a four-year term. The Surgeon General selects one deputy

[15] Public Law 410, 78th Cong., Chap. 373, 2d Sess., approved July 1, 1944.

[16] The title was changed in 1948 to the National Institutes of Health.

Chart X. Organization of the Public Health Service

SURGEON GENERAL
DEPUTY SURGEON GENERAL
EXECUTIVE OFFICER

Under the general supervision and direction of the Federal Security Administrator direct the affairs of the Service and advise on health matters for the United States Government both at home and abroad.

ADVISORY BODIES

National Advisory Health Council
National Advisory Cancer Council
National Advisory Mental Health Council
Federal Hospital Council
Other Boards and Councils as may be authorized.

CONFERENCES

Conference of State and Territorial Health Officers

International Conferences and Special Conferences as authorized.

OFFICE OF THE SURGEON GENERAL

Coordinate dental, nursing, and sanitary engineering activities and foster their professional advancement; advise on policies and new programs; evaluate national health problems and devise public health methods; correlate statistical reporting and analysis; disseminate public information; coordinate participation in international health activities; conduct operating programs in vital statistics, sanitary engineering, nurse training, and international health; develop and maintain personnel, fiscal, supply, and other administrative affairs of the Service.

Division of Dentistry
Division of Nursing
Division of Sanitary Engineering
Division of Public Health Methods
National Office of Vital Statistics
Office of International Health Relations
Division of Commissioned Officers
Office of Personnel
Budget and Fiscal Office
Office of Purchase and Supply
Office of Management Standards and Services
Chief Medical Officer, U.S. Coast Guard

NATIONAL INSTITUTES OF HEALTH

Conduct scientific investigations in the medical and related sciences; coordinate research activities of the Institute and other divisions of the Service and cooperate with other Federal agencies and private institutions; administer research grant and fellowship programs, develop and enforce biologics control regulations.

Office of Director
National Cancer Institute
Division of Infectious Diseases
Division of Physiology
Division of Tropical Diseases
Division of Research Grants and Fellowships
Biologics Control Laboratory
Chemistry Laboratory
Laboratory of Physical Biology
Pathology Research Laboratory

BUREAU OF MEDICAL SERVICES

Administer hospitals and clinics providing medical care to beneficiaries of the Service such as merchant seamen, Coast Guard personnel and injured Federal employees; enforce the national foreign quarantine laws as they apply to sea, air and land transport; make medical examination of aliens and of applicants in certain countries for immigration visas; administer the national mental health program of research, training and aid to States; administer Service functions relating to health programs for Federal employees; provide professional personnel for the medical programs of certain Federal agencies, and maintain liaison with them.

Office of Chief
Foreign Quarantine Division
Hospital Division
Mental Hygiene Division
Federal Employee Health Division

BUREAU OF STATE SERVICES

Administer the Federal aspects of Federal-State cooperative programs for the strengthening of general health activities, the control of tuberculosis, venereal and other communicable diseases, the promotion of industrial hygiene, and the construction of hospitals and community health centers; develop and enforce interstate quarantine regulations; supervise the Philippine Rehabilitation Program; coordinate the work of district offices.

Office of Chief
Office of Administrative Management
Office of Health Education
Office of Public Health Nursing
Industrial Hygiene Division
States Relations Division
Venereal Disease Division
Hospital Facilities Division
Tuberculosis Control Division
Communicable Disease Center

DISTRICT OFFICES

Represent the Surgeon General and various divisions and offices in carrying out the programs and policies of the Service in the States covered by the several Districts; administer field activities of Federal-State cooperative programs; inspect and facilitate the work of field stations of the Service.

surgeon general and several assistant surgeons general from the regular corps.

The act raised the ceiling of Federal appropriations for grants-in-aid to the states for general public health services from 11 million dollars annually (as provided under Title VI of the Social Security Act) to 20 million dollars annually. The rapidity of growth of the service is indicated by the fact that when Dr. Parran was appointed Surgeon General of the service in April, 1936, the total budget amounted to less than 15 million dollars a year, and when his third term expired April 6, 1948, the annual budget was more than 100 million dollars.

The basic Public Health Service statute was amended by Congress on February 25, 1946, to permit settlement of accounts of deceased officers and enlisted men of the Army, Navy, Marine Corps, and Coast Guard and of deceased commissioned officers of the Public Health Service without administration of their estates; by the passage on July 3, 1946, of the National Mental Health Act; and by passage on August 13, 1946, of Public Law 725, the Hospital Survey and Construction Act. Under the President's Reorganization Plan II, effective July 16, 1946, vital-statistics functions were transferred to the Public Health Service from the Bureau of the Census, Department of Commerce under the name of the National Office of Vital Statistics. Functions of the service were further expanded by the act approved August 8, 1946, to provide for health programs for government employees.

On August 13, 1946, the Hill-Burton Act was passed by Congress to provide Federal grants to states for the construction of hospitals and health centers to be administered by the U.S. Public Health Service.

On June 16, 1948, Congress enacted Public Law 655, known as the National Heart Act, to authorize the Public Health Service to launch a full-scale attack upon the leading cause of death, the cardiovascular diseases. This law estab-

lishes a National Heart Institute, provides grants to institutions and individuals for research projects in heart disease, makes funds available to states and other organizations to assist them in establishing community programs of heart disease control, and creates a National Advisory Heart Council.

On June 12, 1948, Congress enacted Public Law 755, known as the Dental Research Act. This act closely parallels the National Heart Act. It amends the U.S. Public Health Service Act by establishing within the service a National Institute of Dental Research. It provides for grants-in-aid for research projects and the training of personnel. It does not provide grants-in-aid for the establishment of control programs in states and communities. It provides a definite ceiling on the appropriations of $750,000 for each fiscal year, beginning with 1948–1949.

Another act was passed by Congress on June 30, 1948. It is known as the Water Pollution Control Act. This law authorizes the Federal government to help individual states control pollution of watercourses by providing technical and financial aid. It is the first specific Federal legislation aimed at protecting our streams. It authorizes the Surgeon General of the U.S. Public Health Service to make joint investigations with states and to prepare or adopt comprehensive programs for eliminating or reducing water pollution. It authorizes the Federal Works Administrator to make loans to any state, municipality, or interstate agency for plans to prevent water pollution.

Three amendments to the Hospital Survey and Construction act were passed by the 80th Congress. These were: (1) Public Law 713, making the act applicable to the Virgin Islands; (2) Public Law 830, defining the minimum amount of Federal funds allotted to states for hospital construction; and (3) Public Law 723, relating to eligibility of states to participate in the hospital construction program after July 1, 1948.

The functions of the U.S. Public Health Service may be summarized as follows:

1. The study of the causes and means of propagation and spread of the diseases of mankind and the development of methods of prevention and control.

2. Maritime quarantine and inspection of passengers and crews of vessels and airplanes arriving from foreign ports. Examination of immigrants and medical inspection of aliens.

3. Interstate quarantine for prevention of the spread of diseases from state to state.

4. Dissemination of public health information.

5. Assistance, through grants to states, counties, cities, and health districts, in establishing and maintaining proper sanitation facilities and general public health services.

6. Supervisory control and licensure of the manufacturers of biological products used in the prevention and treatment of diseases.

7. Study of mental diseases and drug addiction.

8. Provision of hospitalization, general medical and dental care, and preventive health services for American merchant seamen, members of the United States Coast Guard and the Coast and Geodetic Survey, and for other legal beneficiaries of the Service.

9. Operation of special hospitals—the national leprosarium and two hospitals specifically for the care of mental patients and persons addicted to the use of narcotics.

10. Cooperation with other Federal agencies in discharging their various health functions through the assignment of personnel for assistance.

11. Participation in the organization and subsequent functioning of international health organizations.

12. Collection and publication of data on vital statistics.

Other Federal Health Services. In addition to the U.S. Public Health Service, various other Federal agencies carry out functions that are related to public health.[17] These Fed-

[17] Joseph W. Mountain and Evelyn Flook, "Guide to Health Organization in the United States," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Misc. Pub.* 35, 1946.

eral agencies conducting some phase of public health activity are discussed in succeeding sections.

The Children's Bureau, Federal Security Agency. Next to the U.S. Public Health Service, the Children's Bureau probably contributes most to the Federal public health program. The Bureau was created by act of Congress April 9, 1912, and was placed in the Department of Labor by act of March 4, 1913. It was transferred to the Federal Security Agency on July 16, 1946.

Under Title V, Part 1, of the Federal Social Security Act of 1935, the Children's Bureau was made responsible for allotment of Federal funds to the states for the purpose of extending and improving health services available for mothers and children. These funds are used to assist in the support of prenatal and postnatal clinics, of demonstration obstetrical delivery services, of well-child conferences, and of public health nursing services for maternity and child health supervision. Through these grants dentists and nutritionists are also employed by states and localities for services to mothers and children who attend the clinics.

U.S. Office of Education, Federal Security Agency. The U.S. Office of Education was established by an act of Congress approved March 2, 1867, and placed in the Department of the Interior. The Office of Education, with all its functions, was transferred to the Federal Security Agency effective July 1, 1939 and under the provision of the President's Reorganization Plan I.

The Office of Education participates in workshops for the preparation of teachers and stimulates public health education and school health programs. These programs tend to combine instruction in health with that of safety and physical education. Medical examination of school children and teachers is included in the activities of the Office of Education. Grants-in-aid for vocational education are administered, as is the training for health personnel below college grade.

Social Security Administration, Federal Security Agency. Through its several programs of financial assistance the

Bureau of Public Assistance of the Social Security Administration, in cooperation with state and local official welfare agencies, indirectly bears some of the medical costs of three designated needy groups—persons eligible for old-age assistance, dependent children, and those who are blind. The Social Security Administration was originally established as the Social Security Board under the Social Security Act approved August 14, 1935. It was administered as a part of the Federal Security Agency under the direction and supervision of the Federal Security Administrator in accordance with the Reorganization Act of 1939 and Reorganization Plan I effective July 1, 1939. Under Reorganization Plan II of 1946 the Social Security Board was abolished, and its activities were taken over by the Social Security Administration.

Research in the administrative aspect of health and medical care is engaged in by the Social Security Administration's Bureau of Research and Statistics. Reports of the studies made by this bureau have been a significant factor in demonstrating the need for extension of some health services now operating and for the organization and establishment of additional types of service.

Office of Special Services, Federal Security Agency. The Food and Drug Administration is the main Federal organization which safeguards the quality of foods and drugs. Activities of this agency are directed chiefly toward promoting purity, standard potency, and truthful and informative labeling of commodities covered by the Food, Drug and Cosmetic Act, the Tea Act, the Import Milk Act, the Caustic Poison Act, and the Filled Milk Act. Inspection, laboratory tests, and checking constitute the methods of operation.

The Food and Drug Administration was established in the Department of Agriculture by the Food and Drug Act of 1906. It was transferred to the Federal Security Agency by the President's Reorganization Plan IV effective June 30, 1940.

Department of Agriculture. The Department of Agriculture was created by act of Congress approved May 15, 1862, and until 1889 it was administered by a Commissioner of Agri-

culture. By act of February 9, 1889, the powers and duties of the department were enlarged. It was made the eighth executive department in the Federal government, and the commissioner became the Secretary of Agriculture. Several branches of the department engage in activities significant to human health. These are:

1. *Bureau of Animal Industry*, established by act of Congress May 29, 1924, which conducts scientific investigations of the cause, prevention, treatment, and control of diseases and parasites of domestic animals, many of which are transmissible to man.

2. *Office of Production and Marketing Administration*, established by the Meat Inspection Act of June 30, 1906, and March 4, 1907. Meat sold in interstate or foreign commerce is inspected for freedom from disease and wholesomeness for human consumption. The office also controls insecticides, formulates standards for various food products, and finances medical care and health services for seasonal workers imported from other countries for farming communities. The National School Lunch Act of March, 1946, placed administration in the Food Distribution Programs Branch of this administration.

3. *Bureau of Dairy Industry*, established by act of Congress May 29, 1924, engages in studies for the development of sanitary methods of handling milk on the farm, in transit, and in dairy plants.

4. *Bureau of Entomology and Plant Quarantine*, established by the Agriculture Appropriation Act of 1935, pursues studies of insects, including those which affect man.

5. *Bureau of Human Nutrition and Home Economics*, established by the Agriculture Appropriation Act of 1924, conducts research on food and other material essential to health.

6. *Extension Service*, established by the Agriculture Appropriation Act of 1924, through grants-in-aid cooperates with state land-grant colleges in administering the educational

activities of a corps of county extension and home demonstration agents located in nearly all agricultural counties.

7. *Farm Home Administration*, established originally as the Resettlement Administration by authority of the Emergency Relief Appropriation Act of April 8, 1935. It was transferred to the Department of Agriculture, and the name changed to Farm Security Administration, by Executive Order 7530 of December 31, 1936, and the Secretary's Memorandum 732 of September 1, 1937. It was consolidated with the War Food Administration by Executive Orders 9280, 9322, and 9334 and was abolished by act of August 14, 1946, which established the Farmers Home Administration. It contributes to the health and welfare of low-income farmer groups by including medical and dental care among the purposes for which government loans can be obtained through this agency. The group health services have recently been extended to include limited public health activities, particularly farm sanitation.

Housing and Home Finance Agency. The Housing and Home Finance Agency was created as the National Housing Agency by the National Housing Act of 1934, together with numerous yearly amendments down to 1947. On July 27, 1947, under the President's Reorganization Plan III, the Housing and Home Finance Agency was established to consolidate housing functions exercised by nearly a dozen different agencies.

Department of the Interior. The Department of the Interior was created by act of Congress approved March 3, 1849, and was charged with the responsibility for advancing the domestic interests of the people of the United States. Several branches of the department conduct activities in the areas of health.

1. *The Bureau of Mines*, established May 16, 1910, by act of Congress, was transferred in 1925 to the Department of Commerce, and the President acting under authority of the

act of March 3, 1933, returned the Bureau to the Department of the Interior on April 24, 1934. It conducts an accident-prevention campaign through investigation of the causes of mine accidents and by instructing operators and miners in accident prevention, mine rescue, and recovery work. It also conducts studies on the elimination and control of health hazards in the mineral industries.

2. *The Fish and Wildlife Service* was established June 30, 1940, by the consolidation of the former Bureau of Biological Survey (established in 1885) and the Bureau of Fisheries (established in 1871), in accordance with the President's Reorganization Plan III of 1939–1940. The service contributes to health protection by promoting programs for destruction of rodents, some of which are known vectors of disease.

3. *The Office of Indian Affairs* was established by act of Congress March 3, 1849. It has a medical division for administering medical care and public health among the Indian wards of the Federal government. The principal functions are operation of hospitals and general improvement of health and sanitation on Indian reservations.

Veterans Administration. The Veterans Administration was established July 21, 1930, under authority of Executive Order 5398. It maintains hospital, medical, and nursing services for persons discharged from the armed forces. Under the GI Bill of Rights, administered by this agency, educational opportunities of various kinds are made available to discharged veterans. Training of health personnel is stimulated through this program.

Department of Labor. The Department of Labor was established by act of Congress approved March 4, 1913. Several bureaus of the department deal with health problems either directly or indirectly.

1. *The Division of Labor Standards* was created by departmental order in 1934. It establishes minimum age limits for employment, designates maximum working hours for children in industry, and defines hazardous occupations. It pro-

motes health and safety programs in industrial plants, with emphasis upon safety measures for the prevention of industrial accidents and upon general working conditions.

2. *The Women's Bureau* was created first as the Women-in-industry Service in 1918 and was made permanent by act of Congress June 5, 1920. It prescribes working conditions affecting the health of women in industry. It undertakes surveys on health problems concerning women workers.

3. *The Bureau of Labor Statistics* was created originally in the Department of the Interior by an act of June 27, 1884. In 1913 it became the Bureau of Labor Statistics in the Department of Labor. It touches on health problems through receipt of reports of occupational injuries and diseases.

Suggested Reading

Ferrell, John A., and Pauline A. Mead, "History of County Health Organizations in the United States, 1908–1933," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 222, 1936.

Hiscock, Ira V., "District Health Administration—A Study of Organization and Planning," Science Press Printing Co., Lancaster, Pa., 1936.

Mountain, Joseph W., and Evelyn Flook, "Distribution of Health Services in the Structure of State Government," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 184, 3d ed., 1943.

Emerson, Haven, and Martha Luginbuhl, "Local Health Units for the Nation," Commonwealth Fund, Division of Publication, New York, 1945.

Mustard, H. S., "Government in Public Health," Commonwealth Fund, Division of Publication, New York, 1945.

Mountain, Joseph W., and Evelyn Flook, "Guide to Health Organization in the United States," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Misc. Pub.* 35, 1948.

CHAPTER 17

HEALTH EDUCATION

From all that has been said it must be clear that ideas, sound or unsound, have consequences—individual and social. This is particularly true in the history of medicine and in the history of public health. As Garrison has so well pointed out

> . . . the history of medicine is also the history of human fallibility and error. The history of the advance of medical science, however, is the history of the discovery of a number of important fundamental principles leading to new views of disease, to the invention of new instruments, procedures, and devices, and to the formulation of public hygienic laws, all converging to the great ideal of preventive or social medicine. . . .[1]

The development of science has never been continuous, nor even progressive. It has followed a tangled, tortuous line. Ideas of the greatest scientific moment have been throttled at birth, or veered into a blind alley through some current theological prepossessions, or deprived of their chance of fruition through human indifference, narrow-mindedness, or other accidental circumstances.

It is well to remember that man felt before he reasoned. As a creature of emotion he has an immeasurable past; as a creature of reason, he is only of yesterday. Certain beliefs and superstitions have become ingrained in humanity through space and time and *can be eradicated only through the kind of public enlightenment which teaches that prevention is better than cure.* The average human mind everywhere is more

[1] Fielding H. Garrison, "An Introduction to the History of Medicine," W. B. Saunders Company, Philadelphia, 4th ed., rev. and enl., 1929, p. 45. By permission.

characterized by inertia and rock-ribbed conservatism than by originality, alertness, free play, or forward movement. Stern[2] has well illustrated this principle in his clear analysis of the social factors exhibited in the resistance to new ideas advanced in medicine. It is not error which opposes the advance of truth; it is indolence, obstinacy, and the tendency to follow the spirit of routine. It is for this reason that science itself is frequently seen to be passing not from truth to truth but from error to error.

One needs only to review quickly the ideas concerning disease that have been advanced at varying periods of man's history to realize the ever-broadening concepts which have governed the medical sciences. These began with the demoniac possession of the individual; were replaced by the "humoral pathology" of the Greeks; advanced to the idea of the organs of the body as the seats of disease, developed by Morgagni in the eighteenth century; shifted from the organs to the tissues of the body as a result of the work of Bichat at the beginning of the nineteenth century, narrowed the tissues into their cell components following the work of Virchow in the middle of the nineteenth century, and broadened in the twentieth century to the idea of nuclear physics and chemistry.[3] We are today witness to the discoveries of Roentgen (X rays, 1895); of Becquerel (radioactivity, 1896); of Thompson (electron, 1897); of Planck (quantum theory, 1900); of the Curies (radium, 1902); of Rutherford and Soddy (isotopes, 1902 and 1912); of Einstein (relativity, 1905–1916); of Bohr (Bohr atom, 1913); and of Ernest O. Lawrence (cyclotron, 1931). Where these theories and discoveries will lead no one knows. Biology, medicine, and public health are con-

[2] Bernard J. Stern, "Social Factors in Medical Progress," Columbia University Press, New York, 1927.

See also Stern, "Society and Medical Progress," Princeton University Press, Princeton, N.J., 1941.

[3] William Francis Magie, "A Source Book in Physics," McGraw-Hill Book Company, Inc., New York, 1935.

Forest Ray Moulton and Justus J. Schifferes, "The Autobiography of Science," Doubleday & Company, Inc., New York, 1945.

fronted by a tiny bit of protoplasm within whose nucleated cell is locked the secret of animated matter.

This being the situation, health education has to take cognizance of the fact that the first task is to appraise the current beliefs in the individual and the community about disease and health.[4] Every individual builds up a wealth of experience within the family. This experience relates to his own body—eating, sleeping, work and play, and emotional reactions. These experiences are reflected in the community attitudes toward community health. The problem of health education is one of separation of the true from the false. It becomes necessary to "uproot" the false ideas and to replace them with scientific facts. Thus health education has a twofold burden to carry.

In this connection a warning should be sounded. Every health educator should guard against the almost universal habit of *generalizing* from insufficient evidence. Differences in the individual, in families, in neighborhoods, in areas of the city, state, nation, and the world are so widespread that it is difficult *not* to arrive at a general truth that seems to explain a given situation. This proneness to generalization is particularly noticeable in the area of personal hygiene.

Another aspect of health education deals with immediate objectives undertaken either by the individual or by the community. It is obvious that a program projected for the *restoration* of health is based upon a certain group of facts and activities; one designed for the *conservation* of health is founded upon another group of facts and activities; and one directed toward the *promotion* of health has still other groups of facts and activities. Often confusion arises because this separation of facts and activities is not clearly made.

It must also be kept constantly in mind that the processes of educating an individual and a community are slow, intricate, and uneven. The recognition of this fact is seen in the elaborate schemes of tests and measurements that have been

[4] Lawrence K. Frank, "Health Education," *American Journal of Public Health*, Vol. 36, No. 4, April, 1946, pp. 357–366.

devised to discover the degree of responses of the individual. Further recognition of the fact may be observed in the surveys, appraisal forms, evaluation schemes, radio quiz programs, and public opinion polls that have developed to measure the degree of response of the community to the educational processes.[5] *Patience* is the cardinal virtue of any program of individual or community health education. Some objectives are possible of attainment within a comparatively short period of time; others require long periods of patient building.

Broadly speaking, health education embraces three areas of knowledge:

1. The objectives and content of health education.
2. The institutions or services that extend health education.
3. The measures and methods employed in health education.

The objectives and content of health education are constantly changing.[6] These changes are due to new knowledge, expansion of facilities, and improved techniques. A glance backward will give point to this change. We began with the concept of giving alms to the sick and advanced to the concept of sanitation of the environment, to isolation as a measure of protection, to immunology, to medical care, to health education, and to social insurance. In each of these concepts knowledge increased, facilities expanded, and techniques multiplied in number and extent. The process will continue in the future as in the past.

The institutions or services which extend health education have also undergone change. This may be observed in the

[5] "Health Appraisal of School Children," Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, 1948.

[6] Oliver E. Byrd, "Health Instruction Yearbook," 1943 to date, Stanford University Press, Stanford University, Calif.

"Public Health in Mid-stream: The Heritage of the Past; The Seed of the Future," *American Journal of Public Health*, Vol. 38, No. 1, Part II, January, 1948.

development of the main sources from which the individual has secured his knowledge—first in the family, then in the schools, and finally in the community. At the moment the schools and the community are undergoing rapid changes in the concepts of their services to health education.

The measures and methods employed in health education show change. Here again a review of the efforts of individuals and communities to mitigate the penalties of ill-health and to secure the benefits of constructive health[7] reveals the constantly expanding measures and methods employed. Quarantine, isolation, sanitation, immunology, law enforcement, and health education are words depicting many years of struggle to secure the optimum of health for the individual and the community. Where the physician was at first the only person dealing with the problems, there have been added to him the sanitary engineer, the vital statistician, the laboratory technician, the public health nurse, the medical social worker, the dentist, the nutritionist, the hospital, the clinic and health center, the official and unofficial health organizations, and the health educator—to mention only the broader categories employed in the present-day public health program.[8]

Due to these constant changes the health educator must take periodical inventory of his stock of knowledge in these three areas. To accomplish this end he must keep abreast of the changes in objectives and content of health education brought about by scientific discoveries and inventions as well as by the successful experiments that may have been made. He must be alert to new institutions or services that extend health education. He must learn how to utilize all of the community resources, both official and unofficial, for health

[7] Edward J. Stieglitz, "A Future for Preventive Medicine," Commonwealth Fund, Division of Publications, New York, 1945.

[8] Richard H. Shryock, "The Health of the American People—An Historical Survey," Proceedings of the American Philosophical Society, Philadelphia, Pa., Vol. 90, No. 4, September, 1946, pp. 251–258.

education. He must acquire skill in the use of the techniques and methods employed in health education.[9]

The Committee on Professional Education of the American Public Health Association published in 1943 a proposed report outlining the functions of a health *educator*.[10] The committee set forth the functions as twelve in number, as follows:

1. To be responsible for assistance in planning and organizing a program of health education suitable to meet the needs of the community, state, or area to be served. This includes at the outset a survey of needs, the determination of health problems which may be solved, at least in part, by the educational process, and an appraisal of resources.
2. To assist the community in organizing itself to find and solve its health problems.
3. To assist in establishing and maintaining close cooperative working relationships between all agencies (official and nonofficial) which may contribute to health education.
4. To aid in planning, developing, and conducting training programs for employed personnel, in accordance with the policy of the specific agency involved, for health agency personnel, school personnel, and personnel of other agencies. Nearly all public health personnel have important educational opportunities to increase the effective use of these opportunities as an important function of health education leadership.
5. To give aid in accordance with the policy of the institution concerned, in planning the health education aspect of preservice training programs for professional personnel, including public health personnel, school personnel, and others.
6. To provide consultation and guidance to various individuals and groups (such as parent-teacher associations, serv-

[9] Symposium, "Community Resources for Health Education—How Well Are They Being Utilized," *American Journal of Public Health*, Vol. 38, No. 9, September, 1948, pp. 1254–1262.

[10] Committee on Professional Education, "Proposed Report on the Educational Qualifications of Health Educators," *American Journal of Public Health*, Vol. 33, No. 8, August, 1943, pp. 998–1002.

ice clubs, and others) in developing and improving their health education activities.

7. To assist in promoting, organizing, and guiding study programs in the field of health for adult and group-work agencies, such as divisions of adult education, Young Men's Christian Association, and similar groups.

8. To contribute to the improvement of the quality of the health education of the school child in accordance with the standards and policies of the school system through aid in planning school health programs and curriculums of health instruction; through conferences with teachers, supervisors, and school administrators; and through such other activities as the school may desire.

9. To organize and operate an informational service to provide answers to inquiries and to supply source materials and source references in answer to requests.

10. To be responsible for the preparation, selection, assembly, and distribution of health education materials, using the services of special technicians and health experts as necessary. Such materials include reports and other printed materials, visual aids (motion pictures, photographs, graphic materials, exhibits, and posters), and news releases.

11. To organize and assist in conducting a speaker's bureau, conferences, meetings, and radio programs.

12. To establish a program of continuing appraisal of health education methods and materials in order to evaluate the effectiveness of health education procedures.

Health education in the United States may be divided into three distinct phases: (1) *in the family*, where the main instruments in the educational process are the parents, the physician, the public health nurse, the hospital, the clinic, and the health center; (2) *in the school*, where the main reliance is upon the classroom teacher and the specially prepared health educator; and (3) *in the community*, where a variety of agencies and personnel, both official and unofficial, are at present carrying on the process.

There are three main considerations in any program of individual or community health education. The first is to impart accurate information. The second is to make the information lead to motivation—a desire to do something about applying the information. The third is to cause the motivation to lead to action. These steps can be discerned in every successful effort to establish a given program at a specific time.[11]

These three considerations in turn are based upon processes which have contributed to successful programs. These processes are: (1) *research*, or investigation of the basis for proper health promotion; (2) *demonstration*, or testing of the research; (3) *cooperation*, or securing the aid of persons, institutions, or organizations in promoting the demonstration; (4) *standardization*, or establishing accepted measures in carrying forward the demonstration; (5) *education*, or interpreting the results of the demonstration; and (6) *legislation*, or the incorporation in community thinking of the results of the demonstration.

Health educators—whether in the family, the school, or the community—need to distinguish the characteristics of sound procedures in the multifarious institutions and agencies that have come into existence since the turn of the century. There are four fundamental areas that need critical examination: (1) *program*, the stated purposes and activities; (2) *leadership*, the type of preparation and degree of interest of the announced leaders; (3) *organization*, the methods employed to implement the program and objectives; and (4) *finance*, the adequacy of the financial resources to carry out the program and objectives. These four areas are closely in-

[11] Mayhew Derryberry, *et al.*, "What the Public Knows about Health," American Museum of Health, Inc., New York, 1942.

Iago Galdston, "Motivation in Health Education," address presented at the annual meeting of the American Public Health Association, Boston, Mass., 1948 (mimeographed copy through the courtesy of the author).

Clarence King, "Organizing for Community Action," Harper & Brothers, New York, 1948.

terrelated in any successful social program. If any one is weak the social program is likely to be ineffective. The history of social organizations in the United States is one of high mortality because of the failure in one or more of these four areas. The social organizations with long and successful experience are those which have developed an even balance in these four areas.

Health educators use words and phrases to convey ideas. It is, therefore, a basic requirement in a competent health educator to become a student of words and phrases and their definition. At present there is no commonly accepted authoritative source for words and phrases as used in public health in their technical sense. Select at random any book dealing with hygiene, preventive medicine, public health, or health education and it is apparent that the author goes to great pains and sometimes great length in setting forth his definitions of the subject matter. One explanation for this confusion is the rapidity of change in concepts through which the subject matter has developed.

One example will suffice. The Greeks gave the word *phthisis* to the wasting disease; later, the word *consumption* was generally adopted in the English language; and finally, the word *tuberculosis* came into use after Koch discovered the causative agent, the tubercle bacillus. These changes marked an ever-widening sphere of knowledge. The same evolutionary meaning of most words employed in the vocabulary of health education can be traced in the literature.

Another difficulty that confronts the health educator is the use of "blanket words" to cover incomplete or inconclusive knowledge or even downright ignorance of the true facts! An illustration of this use of "blanket words" is the loose use of the word *hereditary*. From the time of Hippocrates down to and some years after Koch discovered the tubercle bacillus the use of the word *hereditary* to explain the origin and development of tuberculosis was almost universally accepted. We know now that the disease is not and never was hereditary. And yet the word is used today to cover many areas in which

we have not yet been able to advance a satisfactory scientific explanation.

Before the idea that tuberculosis was a *communicable* disease could be established in the individual and community, it became necessary to combat all the ideas that had accumulated for centuries that the disease was *hereditary*. An examination of the early programs of the tuberculosis movement will reveal the stress that was placed upon these two words, *hereditary* and *communicable*.

A further difficulty in the use of words and phrases is that they may be used in varying meanings. For example, the use of the word *health* in the *dictionary sense* means "soundness of any living organism." In an *absolute sense* it means "that quality of life in which the body is sound, the various organs function naturally, and the whole organism responds adequately to its environment." In a *relative sense* it means "that quality of life as affected by the conditions of the body, the functioning of the various organs, and the response of the whole organism to environmental influence."

Another example is the phrase *public health*. The section on public health administration of the American Public Health Association[12] gives the phrase three meanings:

1. The general or collective health of the people—this is the use in a *popular* sense.

2. The health of the community as influenced by factors which affect a considerable number of people in some connected way—this is the use in an *administrative* sense.

3. Measures applied to a considerable number of people in

[12] "Public Health Nomenclature," Report of the Committee to the Public Health Administration Section, American Public Health Association, *American Journal of Public Health*, Vol. 15, 1925, pp. 335–336.

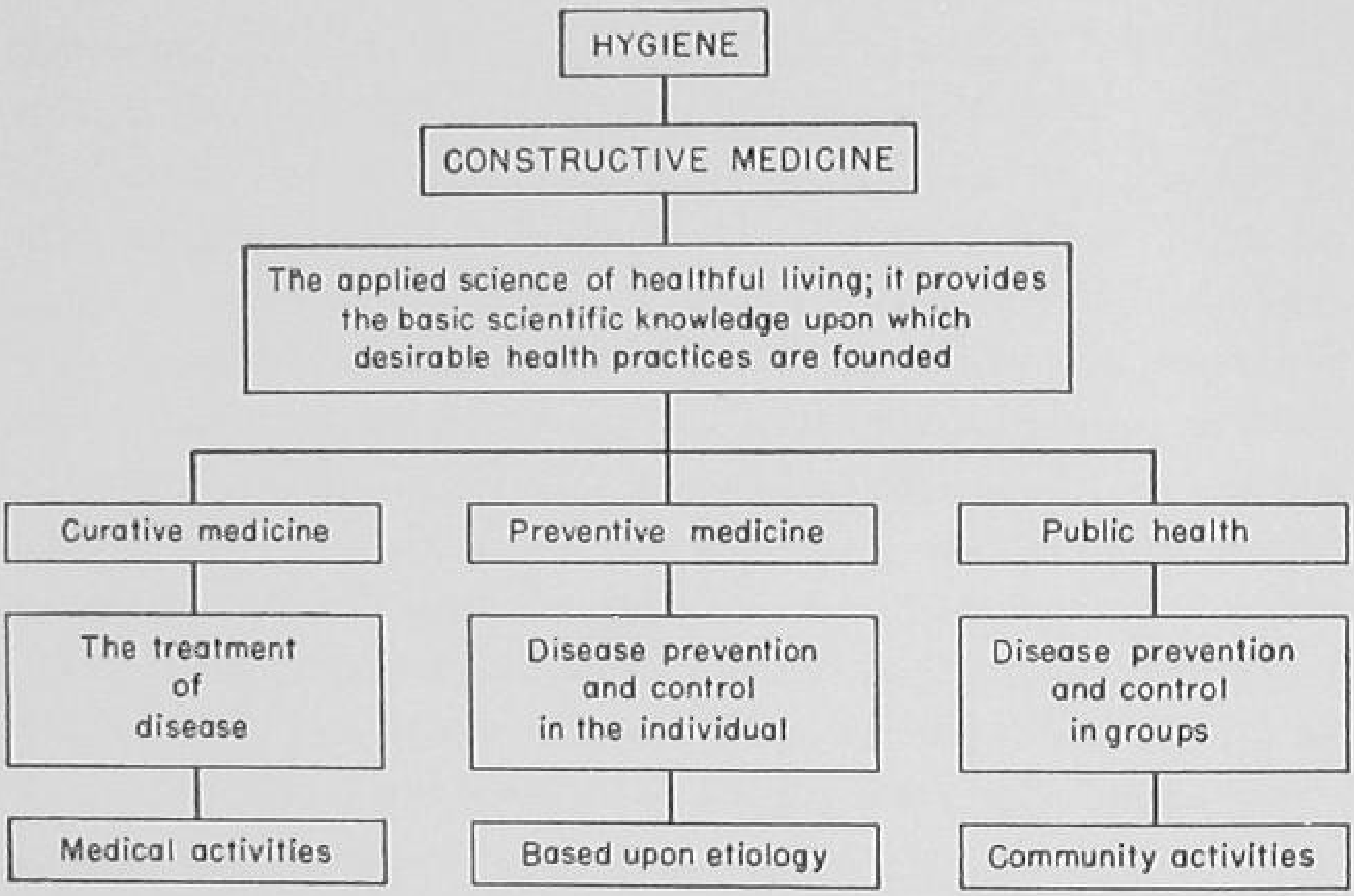
"Definitions of Some Health Education Terms, As Used in Health Education," Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, National Education Association, Washington, D.C. (2d rev.), 1941, p. 16.

Stieglitz, *op. cit.*, pp. 1–14.

some connected way to prevent impairment of health or to promote health and bodily comfort—this is the use in a *technical* sense.

If this confusion applies to words and phrases, then confusion is more confounded when we examine the larger areas embraced in the concepts of *curative medicine, preventive*

CHART XI



medicine, public health, and *health education.* Until there is general agreement as to the definition of terms, the health educator perforce is obliged to build his or her own definitions and relationships. The accompanying chart is given as a guide. It must be remembered that such a rigid diagram is not absolute. Curative and preventive medicine seem at the moment to be merging, and the line of demarcation between these two areas tends to intrude upon the area of public health. And the term *constructive medicine* has only recently been proposed[13] to embrace all the activities employed in the promotion of positive health.

[13] Edward J. Stieglitz, "Pertinent Problems of Geriatric Medicine," *Annals of Internal Medicine*, Vol. 18, No. 1, January, 1943, p. 89.

Suggested Reading

Hill, Frank Ernest, "Educating for Health, A Study of Programs for Adults," American Association for Adult Education, New York, 1939.

Stern, Bernard J., "Society and Medical Progress," Princeton University Press, Princeton, N.J., 1941.

"Report of the Committee on Community Organization for Health Education," American Public Health Association, New York, 1941.

Stieglitz, Edward J., "A Future for Preventive Medicine," Commonwealth Fund, Division of Publication, New York, 1945.

King, Clarence, "Organizing for Community Action," Harper & Brothers, New York, 1948.

CHAPTER 18

THE FUTURE OF HEALTH EDUCATION

Taking a broad view of man's struggles against disease over a period of twenty-five hundred years it becomes clear that *epidemics*, *economic depressions*, and *wars* present the background for the advances that have been made in dealing with disease and in increasing an understanding of health. Man seems to do his best work in times of crises. These seem to act as spurs to society to reexamine the basic content of its culture. Crises have always been productive of social upheaval and the desire for change and improvement.

The late President A. Lawrence Lowell of Harvard University summarized the history of the past four hundred years as follows:

> It is hardly an exaggeration to summarize the history of four hundred years by saying that the leading idea of a conquering nation in relation to the conquered was in 1600, *to change their religion;* in 1700, *to change their laws;* in 1800, *to change their trade;* and in 1900 *to change their drainage*. May we not say that on the prow of the conquering ship in these four hundred years, first stood the priest, then the lawyer, then the merchant, and finally the physician.[1]

We might add that the twentieth century appears to be headed toward a changed view of disease and health and that

[1] Quoted by Abel Wolman, "The Sanitary Engineer Looks Forward," *American Journal of Public Health*, Vol. 36, No. 11, November, 1946, p. 1273, from C.-E. A. Winslow, "International Organization for Health," Commission to Study the Organization of Peace, New York, 1944. (Italics not in the original.) By permission.

such change is being led by a team composed of the physicist, the chemist, the biologist, and the sociologist.

As has been emphasized, we know much more about disease than we do about health. Health education must of necessity organize its material under the two headings of *disease* and *health*.

Diseases may be classified as follows: (1) communicable diseases; (2) occupational diseases; (3) metabolic diseases; (4) food infections and poisonings; (5) nutritional deficiency diseases; (6) organic diseases; (7) psychogenic diseases; and (8) diseases of allergies, intoxications, digestive, and respiratory.

In each of these categories the organization of theories, facts, and problems varies in content and extent from generation to generation. Each category has a "corpus" of literature that daily becomes greater as changes in emphasis and increase in knowledge become available.

Both disease and health depend upon the two forces of *heredity* and *environment*. Heredity determines what the individual can become, while the interaction between heredity and the environment determines what he actually is. So far man's control over his environment far exceeds his control over heredity.

There are two aspects to environment, physical and cultural. The physical conditions in the environment against which man struggles are poverty, malnutrition, bad housing, and overcrowding. These kill, stunt, and cripple man. The cultural factors in the environment are the goals, values, attitudes, habits, skills, knowledge, and prejudices that mold man throughout life.

The emotional, spiritual, and social aspects of health are as important as, if not more important than, the physical aspect of health. The goals of health education must be the maximum attainment of the inherited powers of body, mind, and spirit; the establishment of adequate reserves of vitality in body, mind, and spirit; the formulation of values and attitudes that will ensure a happy adjustment with the members of the

society in which one lives. To achieve these goals it is the task of health education to develop in the individual sound habits and skills, together with the acquisition of knowledge that will strengthen and support such goals.

Health education to be successful must be directed broadly in at least five directions: (1) to the individual in the family and in the school; (2) to the community; (3) to the government; (4) to the natural educators; and (5) to the universities and professional education schools.

Throughout these groupings it is the individual that becomes the focal point in the establishment of physical and cultural values. Thus we have created elaborate means and methods to mold the individual goals. His place in the family, school, and community determines what shall be demanded in matters affecting health. This in turn influences the government, which puts into effect the demands of the community. The natural educators are the parents, physicians, teachers, clergymen, nurses, youth leaders, and social workers. These persons control and influence the attitudes and behavior of the individuals with whom they come into contact. The universities and professional schools for teacher education, medical and nursing education, and social work prepare the personnel for health education of the individual in the family, school, and community.

Dr. Hermann M. Biggs, as chief medical officer of New York City, coined an aphorism which in a sense epitomizes the philosophy and the objective of health education. The aphorism is, "Public health is purchasable. Within certain limitations a community can determine its own death date." Like all generalizations such a statement is subject to critical examination, but as a broad objective it serves a useful rallying point for community health education.

As communities learn and apply the principles of sanitation to their environment, most of the diseases that have been traced to insanitary conditions come under control. These activities need to be continued if such diseases are to be held in check. The same statement holds true for the control of

communicable diseases through the techniques of bacteriology, immunology, and chemotherapy. Most communities in the United States have reached, on the whole, a degree of control that is reflected in diminishing mortality and morbidity rates.

We have witnessed in the past hundred years a constant expansion in breadth and in depth of the program of health in the four areas of service—local, state, national, and international. Along with this expansion of program there has gone a gradual widening of concept involved in health from "medical police" to "public health" and today to "social medicine." The words alleviation, suppression, prevention, education, and insurance emphasize the gradual evolution of the objectives involved in the restoration and conservation of the individual and community health and in the positive promotion of the health of the individual.

In the local area we witness the increase of health resources centering in the family, the school, and the community. We are beginning to bring some semblance of order to our organization processes of professional services, of institutions, and of activities. The professional services, which at first included only the physician, today embrace a wide list of specialized personnel.

The institutions, which at first were confined to the lazarettos, the pesthouses, the fever hospitals, and the dispensaries as welfare agencies, today include a vast array of highly organized and specialized health institutions, such as the general hospitals and the special hospitals—isolation, children's, maternity, industrial, and cripples' and those which treat mental diseases, tuberculosis, venereal diseases, leprosy, and cancer—together with a network of general and special clinics, and health centers.

The activities of these professional services and institutions form a veritable maze as we encounter and analyze them. It is in this area of activities that the greatest confusion exists at present. The broad categories of education, health, and welfare that formerly seemed adequate to cover the social secur-

ity needs of the individual and the community are undergoing rapid changes. For example, the hospital care of mental patients in the United States was at first looked upon as a custodial welfare function and had nothing to do with the health or education activities of the state. Today, mental hygiene takes on health and educational aspects. Or again, in the public health area what was originally a simple list of activities of isolation, quarantine, and nuisance abatement has grown to a list of thirty-five separate categories of activity scattered through seventeen public agencies.[2] This same degree of rapid change and expansion is discernible in the national and international areas of health.

At present it would appear that the reciprocal action of professional services, institutions, and activities in all four areas of influence are undergoing a process of intense integration and experimentation. It also would appear that the health program is centering at the moment upon four broad activities: (1) disease prevention; (2) health promotion; (3) medical care; and (4) rehabilitation.

The health education program in the immediate future must be concerned with the theories, facts, and programs in each of these four broad activities.

Shryock has summarized the problem in the following paragraph:

> . . . The story of national health includes the history of disease and all those means by which a society endeavors to promote health among its members. Medical science, education, and practice, in combination with public health procedures, play the chief roles in the story; but in the back-ground hover social conditions and attitudes that influence health for better or for worse. The state of public health is a major aspect of the life of any people. It has taken Americans long to realize that the health of nations is as significant as the wealth of nations, and that the two are

[2] Joseph W. Mountain and Evelyn Flook, "Distribution of Health Services in the Structure of State Government," Federal Security Agency, U.S. Public Health Service, Washington, D.C., *Bulletin* 184 (3d ed.), 1943.

inextricably combined in the complex which we call contemporary civilization. But the country is closer to a full realization of this than ever before in the national past.[3]

This quotation well states the purposes of this book. The community health education in the future may well be the gathering and interpretation of the over-all trends in disease prevention and health promotion. As J. S. Mill puts it, "power may be local, but knowledge to be most useful must be centralized." The centralization of knowledge relating to disease and health is the function of community health education.

[3] Richard H. Shryock, "The Health of the American People—An Historical Survey," Proceedings of the American Philosophical Society, Philadelphia, Pa., Vol. 90, No. 4, September, 1946, p. 251. By permission.

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